

City Attorney

City of Fort Collins
First Response to EPA
Poudre River Site (#08-HE)
No. 98

SDMS Document ID



1006190

January 13, 2004

Frank P. Prager, Esq.
Assistant General Counsel
Xcel Energy
4653 Table Mountain Drive
Golden, CO

By Facsimile to (720) 497-2087
Original by Regular Mail

**PUBLIC
DOCUMENT**

RE: City of Fort Collins License to Enter Property - Enclosed

Dear Frank:

I've enclosed the signed License to Enter Property per our discussion yesterday. Please note that there is one change that was written on page 1 and initialed by the City Manager; as we discussed this change relates to the need to get City approval before installing temporary structures on the City's property.

John Stokes, the City's Natural Resources Director, has delegated to Margit Hentschel the authority to approve the installation of specific structures under the License. We envision that any such approval will be documented by electronic mail or other writing, but don't require that requests be made in writing. I understand Margit has been in contact with Jennifer McCarter to discuss the particulars of the structures, if any, that may need to be installed during January under the License.

I am also working on a revised Access Agreement for the ongoing work, and will send that to you as soon as I have the revisions ready for your review. I did receive your comments on the Access Agreement this afternoon, but have not yet had a chance to review them.

We appreciate your assistance in completing the License and your work on the other pending issues related to the Poudre River investigation and removal action. Please let me know if there are any other issues it would be helpful to discuss.

Sincerely,

Carrie M. Daggett
Senior Assistant City Attorney

Enclosure (original License)

pc: John Stokes, Natural Resources Department Director, City of Fort Collins
Margit Hentschel, Environmental Manager, City of Fort Collins

LICENSE TO ENTER PROPERTY

The City of Fort Collins, Colorado (hereinafter "Licensor") is the owner of certain real property in Larimer County, Colorado, legally described as shown on Exhibit "A", attached hereto and incorporated herein by this reference (hereinafter "Property"), does hereby grant permission to Public Service Company of Colorado, its employees and authorized agents and contractors (hereinafter "Licensee") to enter the Property for the purpose of initial site preparations and gathering information necessary for the planning and implementation of proposed environmental investigation, removal and restoration work to be completed by Licensee under agreement with Licensor and the U.S. Environmental Protection Agency, including the following:

- Access for survey crews to survey existing property features including, but not limited to locations of existing and proposed groundwater monitoring wells, borings, and other environmental equipment and activities, vegetation, river features, property corners, culverts, and fence lines;
- Access for various utility companies or their representatives to perform utility location services on behalf of the Licensee;
- Access for placement of temporary structures on site ^Y in preparation for future activities on the Property; and ^{gaa} that have been specifically approved by Licensor's Natural Resources Director for placement on site
- Access for temporary on-site preparations consistent with a work plan or partial work plan that has been approved by the Licensor.

As a condition of granting this License, Licensee acknowledges and agrees that:

- With the exception of ordinary wear and tear, upon completion of the activities permitted hereunder, any actual physical damage to the Property as a direct result of the activities by or at the direction of the Licensee shall be remedied by the Licensee to the City's reasonable satisfaction;
- All of the proceeding activities and accesses are to be performed at no cost whatsoever to the Licensor;
- Licensee agrees to and shall protect, save harmless, defend and indemnify the Licensor, and its officers, agents, employees, insurers, successors, and assigns against and from any and all liability, loss, damage, claims, demands, penalties, fines, costs and expenses of whatsoever nature, including court costs and counsel fees, growing out of personal injury to or death of persons whomsoever, or loss or destruction of or damage to property whatsoever, where such personal injury, death, loss, destruction or damage arises because of or is caused by the occupation or use of the Property by, or the presence thereon of, Licensee, its designated representatives, and/or their respective contractors, subcontractors, officers, agents, employees, servants and/or licensees.
- The Licensor expressly disclaims any liability for damage or injuries that may occur to property or persons on the Property, except to the extent the same may result directly from the negligent acts or omissions of Licensor.
- This License does not constitute a waiver of any claim that the either party may have with regard to contamination of the Property and adjacent properties. This License does not constitute an admission by either party of responsibility for any contamination at the Property and adjacent properties.

- This License shall be construed and enforced according to the laws of the State of Colorado, and venue in any proceeding related to the subject matter of this License shall be in Larimer County, Colorado, or, in any federal action, in Denver, Colorado.

This License shall expire after January 30, 2004, unless extended or superceded by a written amendment to the License or a new license superceding this License.

IN WITNESS WHEREOF, the parties hereto have caused this License to be executed the day and year first above written.

THE LICENSOR:

THE CITY OF FORT COLLINS,
COLORADO, a Municipal Corporation

By: John F. Fischbach
John F. Fischbach, City Manager

ATTEST:

Wanda H. Healy
City Clerk

APPROVED AS TO FORM:

Carla H. D. A.
Senior Assistant City Attorney

THE LICENSEE:

PUBLIC SERVICE COMPANY OF COLORADO, a Colorado corporation

By: Olon Plunk
Name: Olon Plunk
Title: Vice President, Environmental Services

EXHIBIT A

DESCRIPTION OF THE ACCESS PROPERTY

A tract of land located in the Northwest quarter of Section 12, Township 7 North, Range 69 West of the Sixth Principal Meridian, a portion of which is in the City of Fort Collins, Larimer County, Colorado, portions of which are located in that certain tract of land described in a Warranty Deed recorded June 27, 1975 in Book 1651 at Page 0454, and also in that certain tract of land described in a Warranty Deed recorded July 12, 1990 at Reception No. 90030336 all of the records of the Clerk and Recorder of the said Larimer County, being more particularly described as follows;

Considering the west line of the said northwest quarter of Section 12 as bearing South 00 degrees 23 minutes 57 seconds West between a found 3 1/4" brass cap monument, at the northwest corner of the said Section 12 and found 3" brass cap monument at the west quarter corner of the said Section 12, based upon G.P.S. observation;

Commencing at the said northwest corner of Section 12;

THENCE along the west line of the said northwest quarter, South 00 degrees 23 minutes 57 seconds West for a distance of 1172.15 feet to the southwesterly extension of the northerly boundary of that certain tract of land described in a Deed recorded April 23, 1956 in Book 1016 at Page 0478, records of the said Clerk and Recorder;

THENCE along the said southwesterly extension and along the said northerly line, North 57 degrees 03 minutes 57 seconds East for a distance of 897.88 feet to the northerly most corner of the said tract described in Book 1016 at Page 0478 and to the TRUE POINT OF BEGINNING of this description;

THENCE leaving the said northerly line, North 47 degrees 34 minutes 50 seconds East for a distance of 163.40 feet to the westerly most corner of the said tract described in Book 1651 at Page 0454;

THENCE along the northerly line of the said tract described in Book 1651 at Page 0454, North 57 degrees 03 minutes 57 seconds East for a distance of 30.06 feet to a line which is 30.00 feet (measured at right angles) northeasterly of and parallel with the southwesterly line of the said tract described in Book 1651 at Page 0454;

THENCE along the said parallel line the following five (5) courses and distances, (1) South 36 degrees 32 minutes 10 seconds East for a distance of 154.07 feet;

(2) South 19 degrees 42 minutes 10 seconds East for a distance of 281.25 feet;

(3) South 60 degrees 19 minutes 10 seconds East for a distance of 202.36 feet;

(4) South 32 degrees 02 minutes 10 seconds East for a distance of 90.75 feet;

(5) South 70 degrees 57 minutes 10 seconds East for a distance of

10.99 feet to the east line of the said tract described in Book 1651 at Page 0454;

THENCE leaving the said parallel line, South 18 degrees 39 minutes 08 seconds East for a distance of 223.92 feet to the said northerly line of the tract described in Book 1016 at Page 0478;

THENCE along the said northerly line the following four (4) courses and distances, (1) North 89 degrees 26 minutes 03 seconds West for a distance of 120.75 feet;

(2) North 16 degrees 15 minutes 33 seconds West for a distance of 243.53 feet;

(3) North 68 degrees 15 minutes 33 seconds West for a distance of 275.86 feet;

(4) North 31 degrees 18 minutes 03 seconds West for a distance of 371.84 feet to the point of beginning. Containing 126029 square feet (2.893 acres) more less.

TOGETHER WITH:

That certain tract of land as described in the said Deed recorded April 23, 1959 in Book 1016 at Page 0478 records of the said Clerk and Recorder.

The above described tracts are subject to all easements and rights of ways now existing or of record.

I hereby state that the above description was prepared by me and is true and correct to the best of my professional knowledge, belief and opinion.

WALLACE C. MUSCOTT COLORADO P.L.S. 17497
P.O. BOX 580 FORT COLLINS, CO 80522

LICENSE AND ACCESS AGREEMENT

THIS LICENSE AND ACCESS AGREEMENT ("License" or "Access Agreement") dated January 23, 2004, is made by and between the City of Fort Collins ("City") and Public Service Company of Colorado d/b/a Xcel Energy, a subsidiary of Xcel Energy Inc. ("PSCo").

WHEREAS, PSCo is investigating and responding to an apparent release of non-aqueous phase liquid generally consisting of polycyclic aromatic hydrocarbons and volatile organic compounds that may have originated from a manufactured gas plant facility historically located on property formerly owned by PSCo or a predecessor and currently owned by Schrader Oil Company or its affiliates across Willow Street from the City's Aztlan Center Property in Fort Collins; and

WHEREAS, no investigation of the apparent release has identified the source of the liquids, and

WHEREAS, a former landfill and other property owned and operated by the City is located between the release and the manufactured gas plant facility; and

WHEREAS, PSCo has agreed to investigate the release and has voluntarily entered into an Administrative Order on Consent ("AOC") with the U.S. Environmental Protection Agency governing its investigation; and

WHEREAS, the investigation and response activities are set out in the Non-Aqueous Phase Source Investigation Work Plan ("Work Plan") attached hereto as Exhibit A; and

WHEREAS, in order to implement the Work Plan, PSCo requires access to and use of certain property more particularly described in Exhibit B attached hereto (herein the "Property"); and

WHEREAS, the City is willing to grant PSCo permission to enter upon and use those portions of the Property in City ownership for the purposes of undertaking actions described in the Work Plan subject to certain terms and conditions outlined herein.

NOW, THEREFORE, in consideration of the above recitals, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the City does hereby grant permission to PSCo and its designated representatives to occupy and use the City-owned portions of the Property for the purposes above indicated upon the following terms and conditions:

1. Except as otherwise set forth herein, PSCo may exercise the rights under this License solely for the purpose of: (a) undertaking the actions described in the Work Plan and the map dated January 19, 2004, attached hereto as Exhibit C; and (b) restoring the Property in

accordance with a restoration plan negotiated in good faith by the Parties. The purpose of the restoration plan is to restore the Property to a condition reasonably determined by the parties to be substantially as good as or better than its condition prior to PSCo's activities thereupon, excluding ordinary wear and tear. PSCo shall be responsible for documenting the condition of the Property in advance of any impacts or changes caused by PSCo's activities hereunder.

2. PSCo shall exercise the rights herein granted to it with due care, and all work shall be performed in a professional workmanlike manner by qualified personnel. To the extent practicable, PSCo shall use existing roads and paths for access to work sites. Any equipment brought onto the Property shall be decontaminated before arrival. The City's approval of this Access Agreement is not and shall not be construed as an endorsement of or approval by the City of the Work Plan. The City shall not, in the exercise of its property rights, interfere with or impede PSCo's access to the Property.

3. All actions undertaken at the Property shall be conducted in compliance with all applicable laws, ordinances, regulations, and orders of governmental authorities. PSCo shall use its best efforts to conduct the work required by the Work Plan in a manner so as not to constitute a public nuisance or a hazard to the health or safety of the general public. PSCo shall, at its expense, obtain all permits, inspections, surveys, consents, approvals, or other authorizations ("Permits") required to be obtained by applicable law, ordinance, regulation, or order in connection with the actions undertaken at the Property. Notwithstanding the foregoing, PSCo shall not be required to obtain any Permit if it is exempt from such requirement under the Comprehensive Environmental Response, Compensation and Liability Act, as amended. If, as a result of PSCo's and/or its designated representative's occupancy or use of or activities on the Property, any law, ordinance, regulation, or order is not complied with, PSCo shall protect, save harmless, defend, and indemnify the City and its officers, agents, employees, insurers, successors, and assigns against and from any and all penalties, fines, costs, and expenses, including court costs and counsel fees imposed upon or incurred by the City or its officers, agents, employees, insurers, successors, and assigns resulting from such non-compliance. PSCo shall be solely responsible for obtaining any substitute water required as a result of the work performed under the AOC. Notwithstanding the foregoing, the City agrees that nothing in this Access Agreement shall be construed to alter any water right owned by any party. The City shall provide reasonable support and cooperation to PSCo in obtaining any substitute water supply required hereunder.

4. PSCo shall be responsible for the proper and lawful handling and disposal of all waste materials or hazardous substances generated as part of the actions undertaken at the Property by or behalf of PSCo including, without limitation, any decontamination fluids. To the extent allowed by applicable law, any manifest or other similar document required for the proper disposal of these materials shall not implicate or otherwise list the City as a generator of such materials.

5. PSCo shall pay, and cause its designated representatives, and their respective contractors, subcontractors, and agents to pay, all indebtedness for labor, equipment, materials, tools, supplies, and services used in the performance of all actions undertaken at the Property; and shall use its best efforts to prevent circumstances giving rise to any lien or charge that any

party may attempt to attach to the Property, or any part thereof, by reason of work, labor, services, or materials supplied, or claimed to have been supplied, to PSCo, its designated representatives, and/or their respective contractors, subcontractors, and agents, or anyone claiming under PSCo, its designated representatives and/or their respective contractors, subcontractors, and agents. PSCo shall take whatever action is reasonable and necessary to defend against or remove any such liens within thirty (30) days following actual notice of the filing thereof. PSCo shall reimburse the City for any costs or damages incurred by the City in connection with any such claimed or asserted liens or charges, including reasonable attorneys' fees.

6. PSCo shall provide and maintain all insurance required by law and all insurance which prudent business judgment dictates is necessary to cover the risks associated with PSCo's intended use and occupancy of the Property and its obligations hereunder. The insurance shall be provided and maintained at the sole cost of PSCo, and shall name the City as an additional insured. PSCo's indemnification obligations included herein shall not be limited in any way by the amount or type of insurance that PSCo chooses to provide and maintain. The City accepts the existing PSCo insurance program, including its self-insurance component, as fulfilling the requirements of this paragraph.

7. PSCo shall, at no cost or expense to the City, furnish to the City copies of analytical results from sampling on the Property and final reports submitted to EPA with respect to the actions undertaken at the Property, and copies of all orders, directives and approvals to/from the Colorado Department of Public Health and Environment ("CDPHE") and/or EPA related to the Work Plan and/or actions undertaken by or on behalf of PSCo on the Property or adjacent property in implementing the Work Plan. Notwithstanding the foregoing, PSCo shall not be required to submit to the City any document or information that qualifies as privileged information or Confidential Business Information under applicable EPA regulations. Copies of these documents will be provided to the City as soon as practicable after the date they become available. The City shall be entitled to arrange for split samples in connection with any sampling conducted by PSCo on the Property, provided that the City's sampling does not interfere unreasonably with PSCo's actions under the AOC or cause delays that could reasonably prevent PSCo from meeting the schedule required by the AOC.

8. All costs associated with any of the actions undertaken at the Property by PSCo, its designated representatives, and/or their respective contractors, subcontractors, and agents shall be borne exclusively by PSCo. Additionally, PSCo shall pay its own legal fees and costs.

9. To the extent PSCo uses third parties to perform any of the actions undertaken at the Property, PSCo shall ensure that such third parties comply with the relevant terms of this Access Agreement, and PSCo shall be responsible to the City for the actions and omissions of said third parties to the same extent PSCo would be responsible if PSCo were conducting the actions itself. The restrictions and terms of this Access Agreement will apply equally to PSCo and PSCo's designated representatives, and their respective contractors, subcontractors, and agents, and PSCo will use its best efforts to ensure that said persons are familiar with the relevant restrictions and terms of this Access Agreement.

10. PSCo will provide weekly notices to the City of the expected schedule and plan for activities to be carried out on the Property during the following week by contacting the City Representative, in the manner and at the address provided below, or such other City Representative as the City may designate by providing written notice to PSCo in the manner set forth below. To the extent allowed by the AOC and applicable law, PSCo will use best efforts to consult with the City in advance regarding work performed at the Site and the impact on the Property. In the event that the scope of work required by the AOC or other order from EPA or the State of Colorado differs significantly from the scope described in the Work Plan, PSCo will provide the City with notice of the significant scope change at the earliest practicable date. In any event PSCo shall, unless precluded by emergency circumstances or exigent circumstances, contact the City Representative in advance of any alterations of the scope or schedule of work that directly impact the City's existing facilities on the Property or require any action on the part of the City.

11. All tools, equipment, and other property placed upon the Property by PSCo and/or its designated representatives shall remain their property and shall be removed within seventy-two (72) hours of completion of the Work Plan and the restoration plan, if any, except to the extent and as the parties may subsequently agree in writing. In the event PSCo and/or its designated representatives shall fail to remove such tools, equipment or other property as required hereunder, the City shall give PSCo notice that it intends to remove such tools, equipment and other property, and may do so if PSCo has not recovered the same within twenty-four (24) hours after notice. PSCo shall reimburse the City for any costs incurred by the City to remove such tools, equipment and other property.

12. PSCo shall be responsible for full compliance with, and agrees to fully comply with, a restoration plan, if any, negotiated hereunder.

13. PSCo agrees to and shall protect, save harmless, defend and indemnify the City, and its officers, agents, employees, insurers, successors, and assigns against and from any and all liability, loss, damage, claims, demands, penalties, fines, costs and expenses of whatsoever nature, including court costs and counsel fees, growing out of personal injury to or death of persons whomsoever, or loss or destruction of or damage to property whatsoever, where such personal injury, death, loss, destruction or damage arises because of or is caused by the occupation or use of the Property by, or the presence thereon of, PSCo, its designated representatives, and/or their respective contractors, subcontractors, officers, agents, employees, servants and/or licensees, except to the extent such personal injury, death, loss, destruction or damage is caused by or arises from the City's negligence or willful misconduct.

14. The City makes no representation about the condition and/or quality of the soils at the Property or the underlying ground water. The City further makes no representation as to the suitability of the Property or any improvements located on the Property for the actions described in the Work Plan.

15. The City shall retain reasonable access to the Property during implementation of the Work Plan and restoration plan, if any. Any City representative desiring access to work areas must comply with the project Health and Safety Plan ("HASP"). Notwithstanding any other

provision of this Agreement, the City shall release and hold PSCo harmless from and against any and all liability arising from the failure of any City representative to comply with the HASP.

16. Notices required hereunder shall be in writing and personally delivered or mailed to the parties at the following addresses:

If to the City of Fort Collins	Margit Hentschel, Environmental Manager Natural Resources Department 281 N. College Avenue P.O. Box 580 Fort Collins, CO 80522-0580
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With copies to:	Carrie Daggett, Sr. Assistant City Atty City Attorney's Office 300 LaPorte Avenue P.O. Box 580 Fort Collins, CO 80522-0580
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If to PSCo:	Terry Staley Manager, Waste and Remediation Xcel Energy Inc. 4653 Table Mountain Dr. Golden, CO 80403
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With copies to:	Frank Prager Assistant General Counsel Xcel Energy Inc. 4653 Table Mountain Dr. Golden, CO 80403
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17. This License is made subject to all outstanding leases and other outstanding superior rights including, but not limited to, rights of way and easements and the right of the City to renew such leases and other outstanding rights and to extend the term thereof, and is made without covenant of title or for quiet enjoyment.

18. It is understood that PSCo does not acquire title or any other interest in the Property by means of this Access Agreement, or any renewal or amendment thereof.

19. This Access Agreement does not constitute a waiver of any claim that the parties may have with regard to contamination of the Property and adjacent properties. This Access Agreement also does not constitute an admission by either party of responsibility for any contamination at the Property and adjacent properties.

20. The failure of the City to insist upon strict performance of any of the provisions of this Access Agreement or to exercise any rights or remedies provided by this Access Agreement, or its delay in the exercise of any such rights or remedies, shall not release PSCo from any of its

responsibilities or obligations imposed by law or by this Access Agreement and shall not be deemed a waiver of any right of the City to insist upon strict performance of this Access Agreement.

21. This Access Agreement shall be construed and enforced according to the laws of Colorado, and venue in any proceeding related to the subject matter of this Access Agreement shall be in Larimer County, Colorado, or, in any federal action, in Denver, Colorado.

22. The provisions of this Access Agreement are severable. The invalidity or unenforceability of any provision shall in no way affect or impair the validity or enforceability of the remaining provisions.

23. This License shall inure to the benefit of and be binding upon the parties hereto, and their heirs, successors, and assigns.

24. By executing this License as provided below, PSCo accepts the terms and conditions hereof and agrees to abide by them. PSCo also represents and warrants that it is authorized to accept the terms and conditions hereof and that the person signing on behalf of PSCo is authorized to bind PSCo to the terms and conditions hereof. The City represents and warrants that it is authorized to enter into this License and the person signing on behalf of the City is authorized to bind the City hereto.

25. This Access Agreement sets forth the entire understanding between the City and PSCo with respect to the City's granting of access to the Property, superseding all negotiations and all prior discussions, agreements, and understandings of the parties, including the "License to Enter Property" executed by the City on January 12, 2004, as amended by the letter from John F. Fischbach to Frank P. Prager and dated January 22, 2004. The parties shall not be bound by or be liable for any statement or representation of any nature not set forth in this Access Agreement. This Access Agreement may not be altered or amended, nor any rights hereunder waived, except by an instrument executed by the party to be charged with the amendment or waiver. No right or obligation of, or default by, any party hereto shall be deemed waived by any other waiver of the same or any other right, obligation, or default, or by any previous or subsequent forbearance or course of dealing.

26. This License shall be effective as of the date first written above and shall extend to and include May 1, 2004 unless earlier terminated by mutual agreement of the parties. The parties acknowledge and agree that all activities, other than restoration work, within the 100-year floodplain shall be completed, and all obstructions removed from the 100-year floodplain, no later than April 1, 2004.

27. Time is of the essence under this Access Agreement.

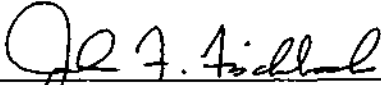
28. In addition to the other covenants provided hereunder, the City shall grant access to the Property to EPA and the State of Colorado and their representatives, including contractors, at all reasonable times for the purpose of conducting any activity related to the AOC.

29. Pursuant to Article XI, Section 10 of the City Charter of the City of Fort Collins, and Resolution 2003-119 of the City Council of the City of Fort Collins authorizing this Access Agreement, the License granted hereunder shall be revocable by the City Council at its pleasure.

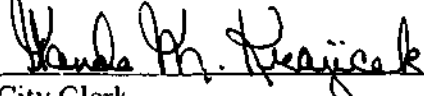
IN WITNESS WHEREOF, the parties hereto have caused this Access Agreement to be executed the day and year first above written.

"CITY":

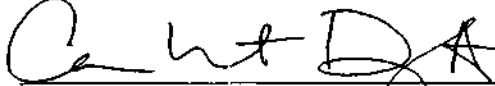
THE CITY OF FORT COLLINS, COLORADO, a
Municipal Corporation

By: 
John F. Fischbach, City Manager

ATTEST:


City Clerk

APPROVED AS TO FORM:


Senior Assistant City Attorney

Public Service Company of Colorado

By: _____
Title: _____

29. Pursuant to Article XI, Section 10 of the City Charter of the City of Fort Collins, and Resolution 2003-119 of the City Council of the City of Fort Collins authorizing this Access Agreement, the License granted hereunder shall be revocable by the City Council at its pleasure.

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Municipal Corporation

By: _____
John F. Fischbach, City Manager

ATTEST:

City Clerk

APPROVED AS TO FORM:

Senior Assistant City Attorney

Public Service Company of Colorado

By: Olan Plunk
Title: Vice President - Environmental

EXHIBIT A

DESCRIPTION OF THE ACCESS PROPERTY

A tract of land located in the Northwest quarter of Section 12, Township 7 North, Range 69 West of the Sixth Principal Meridian, a portion of which is in the City of Fort Collins, Larimer County, Colorado, portions of which are located in that certain tract of land described in a Warranty Deed recorded June 27, 1975 in Book 1651 at Page 0454, and also in that certain tract of land described in a Warranty Deed recorded July 12, 1990 at Reception No. 90030336 all of the records of the Clerk and Recorder of the said Larimer County, being more particularly described as follows;

Considering the west line of the said northwest quarter of Section 12 as bearing South 00 degrees 23 minutes 57 seconds West between a found 3 1/4" brass cap monument, at the northwest corner of the said Section 12 and found 3" brass cap monument at the west quarter corner of the said Section 12, based upon G.P.S. observation;

Commencing at the said northwest corner of Section 12;

THENCE along the west line of the said northwest quarter, South 00 degrees 23 minutes 57 seconds West for a distance of 1172.15 feet to the southwesterly extension of the northerly boundary of that certain tract of land described in a Deed recorded April 23, 1956 in Book 1016 at Page 0478, records of the said Clerk and Recorder;

THENCE along the said southwesterly extension and along the said northerly line, North 57 degrees 03 minutes 57 seconds East for a distance of 897.88 feet to the northerly most corner of the said tract described in Book 1016 at Page 0478 and to the TRUE POINT OF BEGINNING of this description;

THENCE leaving the said northerly line, North 47 degrees 34 minutes 50 seconds East for a distance of 163.40 feet to the westerly most corner of the said tract described in Book 1651 at Page 0454;

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THENCE along the said parallel line the following five (5) courses and distances, (1) South 36 degrees 32 minutes 10 seconds East for a distance of 154.07 feet;

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10.99 feet to the east line of the said tract described in Book 1651 at Page 0454;

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TOGETHER WITH:

That certain tract of land as described in the said Deed recorded April 23, 1959 in Book 1016 at Page 0478 records of the said Clerk and Recorder.

The above described tracts are subject to all easements and rights of ways now existing or of record.

I hereby state that the above description was prepared by me and is true and correct to the best of my professional knowledge, belief and opinion.

WALLACE C. MUSCOTT COLORADO P.L.S. 17497
P.O. BOX 580 FORT COLLINS, CO 80522

**POUDRE RIVER REMOVAL
SITE ASSESSMENT**

FIELD SAMPLING PLAN
Fort Collins, Larimer County, Colorado



Prepared for:



U.S. Environmental Protection Agency
Region 8
999 18th St.
Suite 300
Denver, CO 80202

Developed by:



Tetra Tech EM Inc.
4940 Pearl East Circle, Suite 100
Boulder, CO 80301
303-441-7900

POUDRE RIVER REMOVAL SITE ASSESSMENT

FIELD SAMPLING PLAN Fort Collins, Larimer County, Colorado



Prepared for:



U.S. Environmental Protection Agency
Region 8
999 18th St.
Suite 300
Denver, CO 80202

Developed by:



Tetra Tech EM Inc.
4940 Pearl East Circle, Suite 100
Boulder, CO 80301
303-441-7900

**POUDRE RIVER REMOVAL
SITE ASSESSMENT**

**FIELD SAMPLING PLAN
Fort Collins, Larimer County, Colorado**

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ATTACHMENTS

Attachment

1	Correlations of PAH Concentrations in "Product"
2	Decision Making Logic Diagram

A geophysical survey will be conducted using ground-penetrating radar (GPR) to better define the extent of the landfill and the configuration of the bedrock surface (Pierre shale). Following analysis of the soil gas and geophysical data, strategic soil boring and/or monitoring well locations will be identified. Hollow stem auger (HSA) borings will be advanced to the depth of the bedrock (Pierre shale) surface and into the bedrock to collect soil samples, identify the depth to bedrock, place and sample monitoring wells, and evaluate contaminant migration within the subsurface. Additionally, passive diffusion bag samplers will be placed in the riverbank along the border of the site to evaluate any potential contaminant discharges to the Cache la Poudre River from the Site. Data obtained from these sampling techniques may be used to focus other intrusive sampling and characterization efforts as needed (e.g. trenching). The field investigation approach will be used in conjunction with the CSM to limit uncertainty relative to potential pathways for contaminant migration and the extent of contamination across the Site.

2.0 CONCEPTUAL SITE MODEL

A CSM (Figure 12) is an important tool used to identify key features of a site relative to the site-specific environmental decisions being that may impact remedial and reuse alternatives. A preliminary CSM is developed before an investigation is planned and implemented. Existing data, such as geologic, hydrogeologic, contaminant types, source area characteristics, and other pertinent information are carefully reexamined to assure that the data proposed to be collected will be of sufficient quality and quantity to meet the project objectives.

A CSM includes the identification of suspected contaminant sources and types of contaminants present, potential receptors and exposure points, potential migration pathways, and other project constraints. The CSM uses existing information on the types of contaminants, pathways, receptors, and future land uses to help define areas where further study is needed. The CSM will be continually refined as information is gathered. Modifications to the project approach may be made as more is learned about the site and the data needs are refined.

2.3 SUMMARY OF PREVIOUS INVESTIGATIONS

Previous investigations summarized analytical results for samples collected at the site. Methane gas surveys were conducted at the landfill for the City of Fort Collins in 1977, and in 1979 by GeoTek, Inc. and Raymond Vail Associates. The 1977 survey reported methane concentrations ranging from 0.1 to 4.1 percent gas in twenty-one boring locations. The 1979 survey reported methane detections in four out of twenty-seven boreholes. These detections ranged from five to sixty-two percent of the lower explosive level (LEL) for methane, which is five to fifteen percent methane gas by volume. The highest levels were found in the western portion of the landfill. Perimeter locations near residential, commercial, and industrial areas did not appear to be accumulating methane gas (WALSH 2001b).

The Colorado Department of Health and the Environment (CDPHE) reported that limited sampling of soil and groundwater occurred in 1985 during construction of the United Way Building. Samples were analyzed for metals and semivolatile organic compounds (SVOC) and volatile organic compounds (VOC) (WALSH 2001b). In 1999 groundwater samples were collected from monitoring wells MW-1, MW-2, and MW-3. The sample from MW-1 contained approximately 3,600 µg/L of naphthalene, 27 µg/L of benzene, and 1,400 µg/L of xylene and other hydrocarbons. MW-1 is located on the southern boundary of the former PVG plant site. In addition, chromium was also detected in groundwater in monitoring wells MW-1, MW-2, and MW-3 at concentrations ranging from 1,130 µg/L to 1,250 µg/L (WALSH 2001b).

In the late 1990s, an underground portion of the western gas holder used by the PVG Company was encountered during planning phase of the Downtown River Corridor Project (Stewart Environmental Consultants, Inc. [Stewart] 1996). The underground portion of the gas holder was 10.5 feet deep and filled with coal tar and coal tar contaminated soil. The contents of this gas holder were removed in 1996 by the City of Fort Collins under the CDPHE Voluntary Cleanup Program. The intact underground portion of the gas holder was filled with clean soil and left in place. Rail lines now pass over the former location of the gas holder (WALSH 2001b; Stewart 1996). During the 1996 gas holder tank removal, contaminated soil to the west, south, and east of the gas holder were removed to depths of three to four feet below ground surface (bgs). In addition, three test pits were excavated at locations immediately south and east of the gas holder. Soil containing coal tar and creosote, and green and blue-green stained soil layers, were observed in these test pits. Coal tar and other organic compounds were also visible in groundwater encountered in the test pits. Contaminated soil below four feet bgs and groundwater were not remediated as part of the gas holder remediation (WALSH 2001b; Stewart 1996).

Schrader Oil, the company that owns property and some of the structures associated with the former PVG plant (Figure 2), is conducting ongoing monitoring and remediation as part of a Colorado Department of Labor and Employment (CDLE) Division of Oil and Public Safety (OPS) Corrective Action Plan (CAP). The CAP resulted from a 1994 leaking underground storage tank (UST) and a gasoline groundwater plume documented on the southern portion of the Fort Collins Northside Aztlan Center site and north of the Schrader facility (Paragon Consulting Group [Paragon] 2002).

In September 2002, a sheen was noticed near the south bank of the Poudre River. The apparent origin of the sheen was located in line with the axis of the plume of potentially coal tar related compounds identified by previous investigations. Several PAHs were detected at low levels in samples of water and sheen that were collected on September 24, 2002 (Walsh 2003). URS Operating Services (UOS) collected a sample of the product from the bottom of the Cache la Poudre River on February 5, 2003. The product was black/dark brown, viscous, and appeared to have a high surface tension while under water. Analytical results document that the product collected by UOS is chemically consistent with products associated with the former PVG plant (WALSH 2002b; UOS 2003a). A discussion of product correlation is presented in Section 2.7 and in Attachment 1. Sample results preliminarily indicated the presence of both chlorinated solvents and pesticides.

In May 2003, EPA directed Tetra Tech to prepare a revised FSP for the Targeted Brownfields Assessment (TBA) at the Northside Aztlan Center Site. The FSP was finalized in July 2003 and described field activities conducted to; identify chemical characteristics of the oily material identified in the Cache La Poudre River adjacent to the Site, evaluate the nature and extent of contamination at the Site, and identify pathways for the oily material or other contaminant sources to the river. Results of the TBA indicated the presence of benzene, toluene, ethylbenzene, xylene (BTEX), MTBE, and naphthalene contamination in the southern part of the site. Tetrachloroethene (PCE) was detected in samples collected predominantly from monitoring wells along the western banks of the Cache la Poudre River and in the southeastern part of the site. Additionally, a product sample was collected from the river and sent for offsite analysis. Analytical results document that the product is chemically consistent with products associated with a manufactured gas plant (Tetra Tech 2004).

2.4 SITE GEOLOGY

The Site lies in the northern front range of Colorado. Previous investigations have identified the Site as overlying Post-Piney Creek Alluvium from the upper Holocene underlain by older alluvial gravel consisting of Broadway Alluvium from the Pinedale Glaciation, Pleistocene. The total thickness of the

(2001b) documented the potential threat to indoor air from the volatilization of groundwater plume constituents to indoor air.

Physically impacted sediment in the Cache La Poudre riverbed was observed by the presence of free product. It is currently unknown how this material has reached the river. The apparent discontinuous nature of the plume may or may not reflect the presence of a preferred pathway to the river. Small-scale heterogeneities or preferred pathways could have gone unnoticed as a result of monitoring well completions and fine scale heterogeneities within the alluvium and/or bedrock configuration.

Direct contact with surface soil is not a potential pathway of concern because of the reported presence of a soil cover. Direct contact with surface soil and sediment could be a potential pathway of concern along the berm between the landfill surface and the river to recreational users, but evaluation of this pathway is beyond the scope of this SA.

The presence of NAPL, contaminated groundwater, and subsurface soil are considered to be potential sources of contamination to surface water based on the preliminary CSM (Figure 12).

2.7 CONTAMINANTS OF POTENTIAL CONCERN

Previous investigations at the Site identified a number of VOCs and SVOCs in groundwater and soil (Walsh 2001b, 2002a, 2002b). Semi-volatile contaminants found at elevated levels in the Site soil and groundwater include: naphthalene, benzo(a)pyrene and other PAHs. Volatile contaminants found at elevated levels in site soil and groundwater include: BTEX, MTBE, and chlorinated solvents such as PCE.

In addition to the contamination found within the groundwater plume boundaries identified so far at the Site (Figures 5, 6, 7 and 8), product sample FC-PR-01 was collected by UOS personnel on February 3, 2003 from the Cache La Poudre riverbed (Figure 3). The sample was analyzed for oil and grease, VOCs, SVOCs, pesticides, PCBs, and metals. Detectable levels of VOCs, SVOCs, and some chlorinated pesticides were detected in the product sample; however, it does not appear that substantial impacts to the river for the detected substances have occurred (Walsh 2003). More information concerning the nature and extent of any release is needed before any potential for risk associated with direct or indirect contact with the river or associated sediments can be evaluated.

The high correlations between the concentrations of PAH compounds detected in the riverbed samples (FC-PR-01 and FC-PS-01) and the former PVG gas plant sample (TP-2, 11.5') suggest that the PAHs found in all three samples have a common origin and/or were generated by a common process. Given the extremely poor correlations between the concentrations of PAH compounds in the riverbed samples (FC-PR-01 and FC-PS-01) and the landfill borehole samples (BTH-10 5-15' and H1250) it appears that the landfill materials have a very different composition from the former PVG gas plant sample. The correlation plots and a data table completed by Tetra Tech as part of the TBA are also included in Attachment 1.

3.0 FIELD SAMPLING PLAN STRATEGY

This section describes the sampling strategy and field activities intended to accomplish the objectives outlined in Section 1.0 of this FSP. Activities will adhere to procedures outlined in the Tetra Tech Standard Operating Procedures (SOPs) for conducting field operations at hazardous waste sites (Appendix A). Fieldwork is scheduled for February-April 2004. It is estimated that sampling activities will be completed in 4 mobilizations:

- 1) Passive soil gas samplers will be deployed in approximately 5 to 7 days;
- 2) The soil gas samplers will be retrieved approximately 2 weeks later and a geophysical survey will be conducted and passive diffusion bag samplers will be installed in the riverbank
- 3) The passive diffusion bag samplers will be retrieved approximately 2 weeks after they are placed and sent to a laboratory for chemical analysis
- 4) After the soil gas, passive diffusion bag sampler data, and geophysical survey results have been obtained and reviewed drilling activities and installation of groundwater monitoring wells will commence in a mobilization of approximately 10 to 14 days, depending on field conditions and the level of investigation required.

Based on the results obtained from the geophysical survey, soil gas samples, and field observations, invasive field activities may also include advancing one or more trenches to the depth of bedrock (Pierre shale) to evaluate the presence of potential sources, preferential pathways, and to further characterize subsurface conditions at the Site. If activities associated with the Non-Aqueous Phase Source Investigation indicate that the product source is in or beneath the landfill, additional invasive investigation activities may be conducted to evaluate the extent of the product source. The additional invasive activities may include additional HSA drilling and trenching to the base of the landfill and into bedrock.

Currently, the Xcel Energy Non-Aqueous Phase Source Investigation is being conducted in and along the Cache La Poudre River at the Site. As soon as Site conditions allow, passive diffusion bag samplers will be installed below the depth of saturation in the riverbank, along the Aztlan landfill border to identify persistent contaminant discharge locations to the river.

3.2 FIELD ACTIVITIES

The following section describes field activities designed to meet the project objectives.

3.2.1 Underground Utilities Clearance

Prior to initiating field activities, Tetra Tech will procure a licensed subcontractor to identify and mark underground utilities at all locations where intrusive activities will be conducted.

3.2.2 Soil Gas Survey

Initial field sampling activities will include a soil gas survey, using the EMFLUX[®] passive soil-gas sampling system, in order to identify potential contaminant source areas, facilitate the delineation of groundwater contaminant plumes, provide information on discrete contaminant pathways, and provide data on the lateral distribution and types of contaminants present in the vadose zone. This soil gas survey method will readily detect the presence of VOC contamination and some light end SVOCs in soil and groundwater. Previously detected volatile compounds associated with presence of product at the site include: BTEX, substituted benzenes (1,3,5 trimethylbenzene, 1,2,4 trimethylbenzene, and n-butylbenzene), and total aliphatic hydrocarbons. These compounds may be used to identify locations where the presence of NAPL in the subsurface is likely. Up to 350 of the passive soil-gas sampling devices will be installed in a 50-foot grid across the entire site. Samplers will also be placed every 25 feet along transects placed strategically to intersect known and likely areas of contamination across portions of

3.2.5 Grab Groundwater Sampling

Grab groundwater samples will only be collected where soil borings are advanced without the installation of a monitoring well and visual observations of product and the sheen test are negative. Groundwater grab samples will be analyzed for VOCs, SVOCs, TPH-p, and TPH-e as defined in Section 5.0 of this FSP. Attachment 2 describes criteria for well placement. Sampling locations will be staked and labeled while awaiting location verification using survey techniques (Section 3.2.12).

3.2.6 Monitoring Well Installation

Up to 20 monitoring wells will be installed as part of this SA field effort. The actual locations of boring and monitoring well installations will be determined using information from the CSM, previously located areas of contamination, results of the Non-Aqueous Phase Source Investigation, geophysical investigation, and the soil gas survey. Monitoring wells will be installed as well pairs or 'nested' wells. One well would be set within the overburden at the bedrock interface and one well would be set into bedrock to evaluate potential variations in contaminant movement within the separate lithologic units. Monitoring well installation procedures are discussed in Section 4.5. After installation, the monitoring wells will be sampled as described in Section 4.6.

After installation, the monitoring wells will be properly developed according to Tetra Tech SOP 021 (Appendix A).

3.2.7 Monitoring Well Sampling

Groundwater samples will be collected from newly installed monitoring wells following procedures outlined in Tetra Tech SOP 015 (Appendix A). Following well development, groundwater samples will be collected from the new monitoring wells and analyzed at an off-site laboratory for VOCs, SVOCs, TPH-e, TPH-p, cations, and anions, as described in Section 5.0. The monitoring wells will be sampled as described in Section 4.6.

3.2.8 Groundwater Flow Measurements

Tetra Tech will measure current water levels in existing monitoring wells at the Site and upgradient of the Site as possible and generate a contour map of the potentiometric surface for further refinement of the groundwater flow direction. The groundwater flow direction will be used to support placement of new monitoring wells and locating groundwater grab sample locations. After the conclusion of field activities,

4.2.13 Optional Trenching

Based on results obtained from the geophysical survey, soil gas samples, and field observations; field activities may also include advancing one or more trenches to the depth of bedrock (Pierre shale) to evaluate the presence of potential sources, preferential pathways, and to further characterize subsurface conditions at the Site.

4.0 FIELD PROCEDURES

4.1 SOIL GAS SAMPLING PROCEDURES

Soil gas samplers will be installed by following operating procedures recommended by the manufacturer of the soil gas samplers. Surface debris or vegetation will be removed exposing the ground surface. An electric rotary-hammer fitted with a 0.5 inch by three-foot drill bit will be used to drill an approximately three foot deep hole. The hole will act as a conduit for soil gas, increasing the sampler's sensitivity and allow penetration of the reported one to three foot landfill cap. Using a hammer and a 0.75-inch metal stake, the upper three to four inches of the hole will be widened to permit insertion of the soil gas sampler. If the sampler is to be installed in an area covered with asphalt or concrete, the rotary-hammer will first be used with a one-inch masonry bit to drill a hole to the soils beneath.

The sampling cartridge will be covered with local soils after it has been inserted into the hole. Where the samplers are installed through asphalt or concrete the hole will be covered with mortar. The sampler's location, time and date of emplacement, and other relevant information will be recorded. A GPS unit will be used to record the soil gas sample locations.

And the end of the exposure period (approximately two weeks) the samplers will be retrieved and sent to the laboratory for VOC analysis (target analytes include naphthalene and MTBE). Any holes in concrete or asphalt will be repaired with like material. During installation and retrieval, periodic ambient air control samples will be collected as a quality control measure as described in Section 5.0.

An ultra violet (UV) light box will also be used to aid in the visual observation of NAPL and the description of core samples.

In addition to PID/FID and visual inspection, the presence of NAPL in soil cores will be periodically evaluated using a qualitative water sheen test. This water sheen test will be conducted for portions of the core where visual inspection does not indicate the presence of NAPL.

The water sheen test will be performed by placing soil in a small plastic bag filled with distilled water, shaking the bag and observing the water's surface for signs of sheen. Sheen will be classified as follows:

- No Sheen (NS) – No visible sheen on water surface
- Slight Sheen (SS) – Light colorless film; spotty to globular; spread is irregular, not rapid; areas of no sheen on water surface remain; film dissipates rapidly
- Moderate Sheen (MS) – Light to heavy film; may have some color or iridescence; globular to stringy; spread is irregular to flowing; few remaining areas of no sheen on water surface.
- Heavy Sheen (HS) – Heavy colorful film with iridescence; stringy in appearance; spread is rapid; sheen flows of the sample; most of water surface may be covered with sheen

To characterize the vertical extent of contamination where pooled NAPL is encountered at the bedrock surface, the 4.25-inch auger flights will be pulled from the boring and larger diameter auger flights (e.g. 8.25-inches in diameter) will be advanced to approximately 1 foot into bedrock using the same borehole. Approximately 2 feet of granular bentonite will then be poured through the auger flight and hydrated to create a plug to prevent possible down-hole migration of contaminated fluids. The larger diameter flights will be left in place, acting as a temporary surface casing, and the 4.25-inch auger will be advanced through them to the total depth of the boring (approximately 25 feet into bedrock).

Up to 20 soil samples will be collected from soil cores where PID/FID readings are greatest and/or where other field screening techniques indicate the presence of contamination. Soil samples will be collected following Tetra Tech SOP 005 (see Attachment 2 for the soil sampling decision logic diagram) and sent to an off-site laboratory for VOC, SVOC, TPH-p, and TPH-e analysis. At 3 locations chosen at the discretion of the field team leader, geotechnical samples will be collected. The 3 samples will be collected from the overburden directly above bedrock following Tetra Tech SOP 005. The 3 samples collected from the overburden directly above bedrock will be analyzed for bulk density, effective porosity, grain size distribution, and Atterburg limits. The geotechnical data will provide a preliminary indication of

The bottom of each well will be sealed with flush-threaded end cap. Screen materials shall be installed to ensure that the wells are plumb and correctly aligned. The monitoring well will be installed directly through the auger flights to prevent borehole collapse. Once the well is in place, the drive casing will be removed while simultaneously placing the filter pack around the screened interval. The filter pack will consist of 10-20-mesh sand. Depth to the top of the filter pack will be two feet above the screened interval. An annular seal of bentonite-slurry grout or granular bentonite will be placed from the top of the filter pack sand to the ground surface. If granular bentonite is used, it will be hydrated with potable water after emplacement. The monitoring wells will be completed at the surface with flush-mounted well vaults secured with concrete. Locking 'J'-plugs with locks will be inserted into the top of the monitoring well casing to prevent tampering.

4.6 MONITORING WELL SAMPLING PROCEDURES

Groundwater samples will be collected from the 20 new monitoring wells using an adjustable flow-rate pump following Tetra Tech SOP 015. The intent of this procedure is to minimize turbidity of the water in the well and in the formation by maintaining laminar (non-turbulent) flow. The purpose of minimizing turbidity is to limit mobilization of colloids and volume of total suspended solids. Introduction of increased amounts of these naturally suspended particles in the water sample has been proven to artificially bias natural concentrations of target compounds and analytes that are sorbed to these particles. As pumping commences the field team will collect any product that might be encountered for chemical analysis.

An adjustable flow-rate pump will be used to purge water from the well (micropurging). The water level in the well will be monitored during purging to ensure drawdown of less than 0.3 foot. Temperature, turbidity, dissolved oxygen (DO), and pH will be monitored during purging. Purging will continue until these parameters stabilize to within ± 1.0 degrees Fahrenheit, $\pm 10\%$ for DO and turbidity, and ± 0.1 units for pH over three consecutive readings or until three casing volumes have been removed. Measurement data will be recorded on a groundwater sampling data sheet (Appendix B)

Sample collection for groundwater will begin immediately after parameters stabilize. Samples for VOC and TPH-p analyses will be collected first, followed by samples for SVOCs, TPH-e, anions, and cations. Sample fractions for SVOCs and TPH-e may be combined or split for use should sample volume be an issue. Such changes in the sampling protocols will require prior approval by the project chemist. Table 3 presents groundwater sample volume, preservation, and container requirements. A list of analyses proposed, preservation procedures and sample volumes, target analytes, expected levels of quantitation

5.0 SAMPLING HANDLING AND ANALYSIS

5.1 SAMPLE DESIGNATION

Each sample will be given a unique identification designation. The unique designation will be associated with a specific sampling location. The designation will be an alphanumeric combination signifying the location, sample matrix, and sequential number. Table 2 lists sample designations and associated analyses to be performed on the sample.

5.2 SAMPLE ANALYSIS

All groundwater samples collected from monitoring wells will be analyzed for VOCs by EPA SW-846 method 8260 (target compounds include naphthalene and MTBE), semi-volatile organic compounds (SVOCs) by EPA SW-846 method 8270, TPH-p and TPH-e by EPA SW-846 method 8015M, anions by EPA Method for chemical analysis of water and wastes (MCAWW) method 300.0. Grab groundwater samples not collected from monitoring wells will be analyzed for VOCs (including naphthalene and MTBE), SVOCs, TPH-p, and TPH-e (Tables 4 and Appendix D).

Quality Assurance/Quality Control (QA/QC) samples will be collected in addition to the field groundwater samples listed in Tables 1 and 2. Additional volume for laboratory matrix spike/matrix spike duplicates (MS/MSDs) will be collected at a frequency of 1 per 20 field samples (5%). Field duplicate samples will be collected at a frequency of 1 per 10 field samples (10%), trip blanks for VOC analysis will be collected daily with groundwater, soil, or product samples and 1 set shipped per cooler carrying samples for VOC analysis. Equipment rinsate samples collected to assess the effectiveness of decontamination procedures will be collected at a frequency of 1 per sampling event (mobilization) for the entire suite of analyses. Rinsate samples will be collected for each piece of drilling or sampling equipment used at multiple locations and requiring decontamination. The actual number of field samples and associated QC samples collected will be determined dynamically as work progresses. The frequency requirements for collection of QC samples is shown on Table 2.

Soil samples collected during the drilling phase will be analyzed for VOCs by EPA SW-846 method 8260 (target compounds include naphthalene and MTBE), SVOCs by EPA SW-846 method 8270, TPH-p, and TPH-e by EPA SW-846 method 8015M (Tables 1, 2 4). Soil samples will also be subject to the QC sample frequency requirements provided in Table 2.

5.4 CHAIN OF CUSTODY

Chain-of-custody recording procedures will be used to provide an accurate written record that traces the possession of individual samples from the time of collection in the field to the time of acceptance at the off-site laboratory. The chain-of-custody record will also be used to document the samples collected and the analyses requested.

6.0 DATA QUALITY, REDUCTION, VALIDATION, AND DELIVERABLES

All laboratory data and electronic data deliverables (EDDs) will be reviewed by the Tetra Tech project chemist for consistency and accuracy. Off-site laboratories procured as part of this SA are required to meet the EDD format and content described in Appendix C. Selected data packages may be validated by a third party validation firm at the discretion of the project team and will be determined at a later date by the EPA Region VIII On Scene Coordinator. If required, data validation procedures will follow the "National Functional Guidelines for Organic Data Review" (EPA 1999) and the "National Functional Guidelines for Inorganic Data Review" (EPA 2002).

6.1 DATA QUALITY OBJECTIVES

Data Quality Objectives (DQOs) are used to identify the quantity and quality of data to be collected to support the objectives of the SA at the Fort Collins Aztlan Center site. Table 5 summarizes the DQOs for the project.

Guidance for the preparation of DQOs is provided in "Guidance for the Data Quality Objectives Process" (EPA 2000). The seven steps of the DQO process are:

installed and optional trenching may be employed to evaluate potential persistent contaminant discharge locations to the river, evaluate the presence of preferential pathways, and to further characterize subsurface conditions and refine the CSM for the Site.

Step 4: Define the Study Boundaries.

Based on the decisions identified in Step 2 of the DQO process study, boundaries are identified to further focus sampling and analysis efforts. The lateral extent of the study area encompasses the Aztlan Center property along the River from the railroad truss to the north to Linden Street to the south and east to Willow Street. The study boundaries may extend beyond the property boundaries during the geophysical survey to delineate the extent of the historical landfill on site. The vertical boundary of the study is from ground surface to a depth of 25 feet below the bedrock interface (Table 5). Temporal study boundaries include expectations that scheduled SA activities will be completed in February through April of 2004.

Step 5: Develop a Decision Rule

Decision rules or if, then statements are developed that correspond with each major decision identified in Step 2 of the DQO process. Decision rules generally apply when making statements associated with risk estimation. Because this investigation targets primary pathway and plume delineation, decision rules are more basic. For example, if a preferential pathway, or product is evident in the soil gas and geophysical survey, then a boring will be installed to confirm the presence or absence of a preferred pathway and/or product. Decision logic planned for the dynamic field activities associated with this SA is presented in Attachment 2.

Step 6: Specify Limits on Decision Errors

In Step 6 of the DQO process the tolerable limits on decision error are established. For this project, tolerable levels of decision error will be established once decision rules based on the presence or absence of mobile NAPL are developed. This project is currently in the SA phase where the project team will attempt to identify source areas and preferential pathways for contaminant migration at the site and decision errors are not necessary to meet project objectives. Development of tolerable decision errors will be based on data collected during the TBA and the SA and will continue to be refined as more data is collected.

6.3 DATA ASSESSMENT ACCEPTANCE CRITERIA

Data acceptance criteria for each of the five data assessment parameters (accuracy, precision, completeness, representativeness, and comparability) are expressed as quantitative and qualitative statements and are detailed below.

6.3.1 Precision

Precision is a measure of mutual agreement among replicate (or between duplicate) or collocated sample measurements for the same analyte. The closer the numerical values of the measurements are to each other, the more precise the measurement. Precision for a single analyte will be expressed as the relative percent difference for results of field replicate samples, matrix spike duplicate samples for organic analyses, and duplicate samples for inorganic analyses. In addition, precision will be maintained by conducting routine instrument checks to demonstrate that operating characteristics are within predetermined QC limits. The exact limits required for decision making purposes for precision will be established based on a review of analytical results and their relationship to decision criteria which may or may not be related to an action level or the result of a statistical test. In general the data obtained will be qualified in accordance with the requirements of the Contract Laboratory Program (CLP) and the need for corrective action based on poor precision in the field will be made by the project chemist.

6.3.2 Accuracy

Accuracy is a measure of precision and the bias in a measurement system. The closer the value of the measurement agrees with the true value, the more accurate the measurement. Accuracy will be expressed as the percent recovery of the analyte from a surrogate or matrix spike sample and occasionally from the analysis of a standard reference sample compared to actual analyte concentration. Bias of the field measurement will be evaluated during the demonstration of methods applicability and any bias accounted for as the data is obtained and evaluated by the project chemist.

6.3.3 Representativeness

Representativeness is a qualitative parameter that expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. The design of and rationale for the sampling program (in terms of the purpose for sampling, selection of sampling locations, the number of samples to be collected, the ambient

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APPENDICES

SOP APPROVAL FORM

TETRA TECH EM INC.

ENVIRONMENTAL STANDARD OPERATING PROCEDURE

GENERAL EQUIPMENT DECONTAMINATION

SOP NO. 002

REVISION NO. 2

Last Reviewed: December 1999

K. Riesing

Quality Assurance Approved

February 2, 1993

Date

- Alconox
- Tap water
- Distilled water
- Plastic sheeting
- Aluminum foil
- Methanol or hexane
- Dilute (0.1 N) nitric acid

2.0 PROCEDURE

The procedures below discuss decontamination of personal protective equipment (PPE), drilling and monitoring well installation equipment, borehole soil sampling equipment, water level measurement equipment, and general sampling equipment.

2.1 PERSONAL PROTECTIVE EQUIPMENT DECONTAMINATION

Personnel working in the field are required to follow specific procedures for decontamination prior to leaving the work area so that contamination is not spread off-site or to clean areas. All used disposable protective clothing, such as Tyvek coveralls, gloves, and booties, will be containerized for later disposal. Decontamination water will be containerized in 55-gallon drums.

Personnel decontamination procedures will be as follows:

1. Wash neoprene boots (or neoprene boots with disposable booties) with Liquinox or Alconox solution and rinse with clean water. Remove booties and retain boots for subsequent reuse.
2. Wash outer gloves in Liquinox or Alconox solution and rinse in clean water. Remove outer gloves and place into plastic bag for disposal.
3. Remove Tyvek or coveralls. Containerize Tyvek for disposal and place coveralls in plastic bag for reuse.
4. Remove air purifying respirator (APR), if used, and place the spent filters into a plastic bag for disposal. Filters should be changed daily or sooner depending on use and application. Place respirator into a separate plastic bag after cleaning and disinfecting.
5. Remove disposable gloves and place them in plastic bag for disposal.

5. Decontaminate all pipe placed down the hole as described for drilling equipment.

2.4 WATER LEVEL MEASUREMENT EQUIPMENT DECONTAMINATION

Field personnel should decontaminate the well sounder and interface probe before inserting and after removing them from each well. The following decontamination procedures should be used:

1. Wipe the sounding cable with a disposable soap-impregnated cloth or paper towel.
2. Rinse with deionized organic-free water.

2.5 GENERAL SAMPLING EQUIPMENT DECONTAMINATION

All nondisposable sampling equipment should be decontaminated using the following procedures:

1. Select an area removed from sampling locations that is both downwind and downgradient. Decontamination must not cause cross-contamination between sampling points.
2. Maintain the same level of protection as was used for sampling.
3. To decontaminate a piece of equipment, use an Alconox wash; a tap water wash; a solvent (methanol or hexane) rinse, if applicable or dilute (0.1 N) nitric acid rinse, if applicable; a distilled water rinse; and air drying. Use a solvent (methanol or hexane) rinse for grossly contaminated equipment (for example, equipment that is not readily cleaned by the Alconox wash). The dilute nitric acid rinse may be used if metals are the analyte of concern.
4. Place cleaned equipment in a clean area on plastic sheeting and wrap with aluminum foil.
5. Containerize all water and rinsate.

1.0 BACKGROUND

Soil sampling is conducted for three main reasons. First, samples can be obtained for laboratory chemical analysis. Second, samples can be obtained for laboratory physical analysis. Third, samples can be obtained for visual classification and field screening. These three sampling objectives can be achieved separately or in combination with each other. Sampling locations are typically chosen to provide chemical, physical, or visual information in both the horizontal and vertical directions. A sampling and analysis plan is used to outline sampling methods and provide preliminary rationale for sampling locations. Sampling locations may be adjusted in the field based on the screening methods being used and the physical features of the area.

1.1 PURPOSE

Soil sampling is conducted to determine the chemical, physical, and visual characteristics of surface and subsurface soils.

1.2 SCOPE

This standard operating procedure (SOP) describes procedures for soil sampling in different areas using various implements. It includes procedures for test pit, surface soil, and subsurface soil sampling, and describes eight devices.

1.3 DEFINITIONS

Hand auger: Instrument attached to the bottom of a length of pipe that has a crossarm or "T" handle at the top. The auger can be closed-spiral or open-spiral.

Bucket auger: A type of auger that consists of a cylindrical bucket 10 to 72 inches in diameter with teeth arranged at the bottom.

1.5 REQUIREMENTS AND RESOURCES

Soil sampling requires that one or more of the following types of equipment be used:

<u>Sampling Equipment</u>	<u>Other Required Equipment</u>
Spoons and spatulas	Sample containers, labels, and chain-of-custody forms
Trowel	Logbook
Shovel or spade	Tape for measuring recovery
Trier	Soil classification information
Core sampler	Wax for sealing ends of thin-wall tube
Hand auger	Plastic sheeting
Bucket auger	Decontamination equipment
Split-spoon	Drilling equipment
Thin-wall tube	Backhoe
	Health and safety equipment

2.0 PROCEDURES

This SOP presents procedures for conducting test pit, surface soil, and subsurface soil sampling. The site sampling plan will specify which of the following procedures will be used.

Soil samples for chemical analysis should be collected in the following order: (1) volatile organics, (2) semivolatile organics, and (3) metals. Once the chemical samples have been containerized, samples for physical analyses can be containerized. Typical physical analyses conducted include (1) grain size distribution, (2) moisture content, (3) saturated permeability, (4) unsaturated permeability, and (5) Atterberg limits. Additionally, visual descriptions of samples, using the Unified Soil Classification System (USCS), should be recorded. Field tests such as head space analyses can also be conducted.

Soil samples for chemical analyses can be collected either as grab samples or composite samples. A grab sample is collected from a discrete location or depth. A composite sample consists of soil combined from more than one discrete location. Typically, composite samples consist of soil obtained from several locations and homogenized in a stainless steel or Teflon® pan or tray. Samples for volatile organic analysis (VOA) should not be composited.

2.2 SURFACE SOIL SAMPLING

The surface soil sampling equipment presented in this SOP is best suited for sampling to depths of 0 to 6 feet below ground surface (bgs). The sample depth, sample analyses, soil type, and soil moisture will also dictate the best suited sampling equipment. Prior to sample collection, the sampling locations should be cleared of any surface debris such as twigs, rocks, and litter. The following table presents various surface soil sampling equipment and their effective depth ranges, operating means (manual or power), and sample types collected (disturbed or undisturbed).

Sampling Equipment	Effective Depth Range (feet bgs)	Operating Means	Sample Type
Hand Auger	0 to 6	Manual	Disturbed
Bucket Auger	0 to 4	Power	Disturbed
Core Sampler	0 to 4	Manual or Power	Undisturbed
Shovel	0 to 6	Manual	Disturbed
Trier	0 to 1	Manual	Disturbed
Trowel	0 to 1	Manual	Disturbed
Spoon/Spatula	0 to 0.5	Manual	Disturbed

The procedures for using these various types of sampling equipment are discussed below.

2.2.1 Hand Auger

A hand auger equipped with extensions and a "T" handle is used to obtain samples from a depth of up to 6 feet. If necessary, a shovel may be used to excavate the topsoil to reach the desired subsoil level. If topsoil is removed, its thickness should be recorded. Samples obtained using a hand auger are disturbed in their collection; determining the exact depth at which samples are obtained is difficult.

The hand auger is screwed into the soil at an angle of 45 to 90 degrees from horizontal. When the entire auger blade has penetrated soil, the auger is removed from the soil by lifting it straight up without turning it, if possible. If the desired sampling depth has not been reached, the soil is removed from the auger and

2.2.4 Shovel

A shovel may be used to obtain large quantities of soil that are not readily obtained with a trowel. A shovel is used when soil samples from a depth of up to 6 feet are to be collected by hand excavation; a tiling spade (sharpshooter) is recommended for excavation and sampling. A standard steel shovel may be used for excavation; either a stainless steel or polypropylene shovel may be used for sampling. Soil excavated from above the desired sampling depth should be stockpiled on plastic sheeting. Soil samples should be collected from the shovel and placed into the sample container using a stainless-steel scoop, plastic spoon, or other appropriate tool.

2.2.5 Trier

A trier (Figure 2) is used to sample soil from a depth of up to 1 foot. A trier should be made of stainless steel or polypropylene. A chrome-plated steel trier may be suitable when samples are to be analyzed for organics and heavy metal content is not a concern.

Samples are obtained by inserting the trier into soil at an angle of up to 45 degrees from horizontal. The trier is rotated to cut a core and is then pulled from the soil being sampled. The sample is then transferred to an appropriate sample container.

2.2.6 Trowel

A trowel is used to obtain surface soil samples that do not require excavation beyond a depth of 1 foot. A trowel may also be used to collect soil subsamples from profiles exposed in test pits. Use of a trowel is practical when sample volumes of approximately 1 pint (0.5 liter) or less are to be obtained. Excess soil should be placed on plastic sheeting until sampling is completed. A trowel should be made of stainless steel or galvanized steel. It can be purchased from a hardware or garden store. Soil samples to be analyzed for organics should be collected using a stainless steel trowel. Samples may be placed directly from the trowel into sample containers.

been collected. The remainder of the recovered soil can then be used for visual classification of the sample and containerized for physical analysis. The entire sample (except for the top several inches of possibly disturbed material) is retained for analysis or disposal.

2.3.2 Thin-Wall Tube Sampler

A thin-wall tube sampler, sometimes called the Shelby tube (Figure 4), may be pressed or driven into soil inside a hollow-stem auger flight, wash bore casing, or uncased borehole. The tube sampler is pressed into the soil without rotation to the desired depth or until refusal. If the tube cannot be advanced by pushing, it may be necessary to drive it into the soil without rotation using a hammer and drill rod. The tube sampler is then rotated to collect the sample from the soil and removed from the borehole.

After removal of the tube sampler from the drilling equipment, the tube sampler should be inspected for adequate sample recovery. The sampling procedure should be repeated until an adequate soil core is obtained (if sample material can be retained by the tube sampler). The soil core obtained should be documented in the logbook. Any disturbed soil is removed from each end of the tube sampler. If chemical analysis is required, VOA samples must be collected immediately after the tube sampler is withdrawn. Before use, and during storage and transport, the tube sampler should be capped with a nonreactive material. For physical sampling parameters, the tube sampler should be sealed by pouring three 0.25-inch layers of sealing liquid (such as wax) in each end, allowing each layer to solidify before applying the next. The remaining space at each end of the tube is filled with Ottawa sand or other, similar sand, which is allowed to settle and compact. Plastic caps are then taped over the ends of the tube. The top and bottom of the tube sampler should be labeled and the tube sampler should be stored accordingly.

FIGURE 2

TRIER

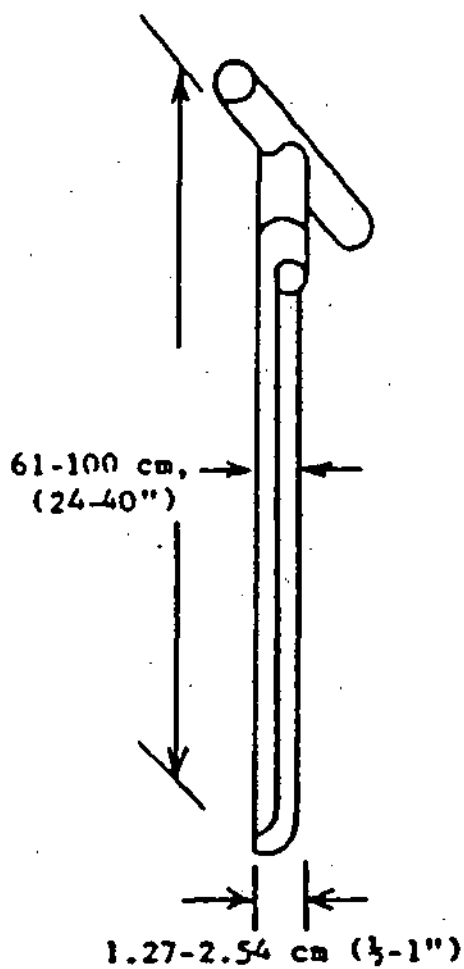
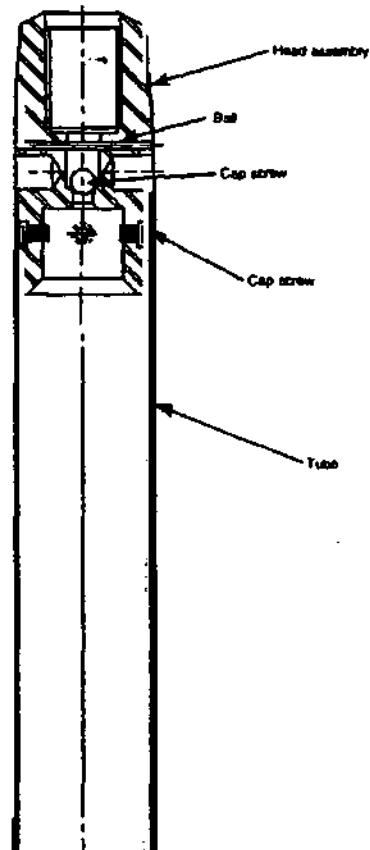


FIGURE 4
THIN-WALL TUBE SAMPLER



1.0 BACKGROUND

Groundwater sample collection is an integral part of site characterization at many contaminant release investigation sites. Often, a requirement of groundwater contaminant investigation is to evaluate contaminant concentrations in the aquifer. Since data quality objectives of most investigations require a laboratory setting for chemical analysis, samples must be collected from the aquifer and submitted to a laboratory for analysis. Therefore, sample collection and handling must be conducted in a manner that minimizes alteration of chemical characteristics of the groundwater.

In the past, most sample collection techniques followed federal and state guidance. Acceptable protocol included removal of water in the casing of a monitoring well (purging), followed by sample collection. The water in the casing was removed so groundwater from the formation could flow into the casing and be available for sample collection. Sample collection was commonly completed with a bailer, bladder pump, controlled flow impeller pump, or peristaltic pump. Samples were preserved during collection. Often, samples to be analyzed for metals contamination were filtered through a 0.45-micron filter prior to preservation and placement into the sample container.

Research conducted by several investigators has demonstrated that a significant component of contaminant transport occurs while the contaminant is sorbed onto colloid particles. Colloid mobility in an aquifer is a complex, aquifer-specific transport issue, and its description is beyond the scope of this Standard Operating Procedure (SOP). However, concentrations of suspended colloids have been measured during steady state conditions and during purging activities. Investigation results indicate standard purging procedures can cause a significant increase in colloid concentrations, which in turn may bias analytical results.

Micropurge sample collection provides a method of minimizing increased colloid mobilization by removing water from the well at the screened interval at a rate that preserves or minimally disrupts steady-state flow conditions in the aquifer. During micropurge sampling, groundwater is discharged from the aquifer at a rate that the aquifer will yield without creating a cone of depression around the sampled well. Research indicates that colloid mobilization will not increase above steady-state conditions during low-flow discharge. Therefore, the collected sample is more likely to represent steady-state groundwater chemistry.

Specific conductance: The reciprocal of the resistance in ohms measured between opposite faces of a centimeter cube of aqueous solution at a specified temperature.

Turbidity: A measurement of the suspended particles in a liquid that have the ability to reflect or refract part of the visible portion of the light spectrum.

1.4 REFERENCES

Puls, R. W. and M. J. Barcelona. 1996. Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures. U.S. Environmental Protection Agency. Office of Research and Development. EPA/540/S-95/504. April.

1.5 REQUIREMENTS AND RESOURCES

The following equipment is required to complete micropurge sample collection :

- Water level indicator
- Adjustable flow rate pump (bladder, piston, peristaltic, or impeller)
- Discharge flow controller
- Flow-through cell
- pH probe
- Dissolved oxygen (DO) probe
- Turbidity meter
- Oxidation and reduction (Redox or Eh) probe
- Specific conductance (SC) probe (optional)
- Temperature probe (optional)
- Meter to display data for the probes
- Calibration solutions for pH, SC, turbidity, and DO probes, as necessary
- Container of known volume for flow measurement or calibrated flow meter
- Data recording and management system

range set by the manufacturer. Because Eh is temperature dependent, the measured value should be corrected for site-specific variance from standard temperature (25 °C). The Eh probe should be replaced if the reading is not within the manufacturer's specified range. All calibration data should be recorded on the Micropurging Groundwater Sampling Data Sheet attached to this SOP or in a logbook.

2.2 WELL PURGING

The well to be sampled should be opened and groundwater in the well allowed to equilibrate to atmospheric pressure. Equilibration should be determined by measuring depth to water below the marked reference on the wellhead (typically the top of the well casing) over two or more 5-minute intervals. Equilibrium conditions exist when the measured depth to water varies by less than 0.01 foot over two consecutive readings. Total depth of well measurement should be made following sample collection, unless the datum is required to place nondedicated sample collection equipment. Depth to water and total well depth measurements should be made in accordance with procedures outlined in SOP No. 014 (Static Water Level, Total Well Depth, and Immiscible Layer Measurement).

If the well does not have a dedicated sample collection device, a new or previously decontaminated portable sample collection device should be placed within the well. The intake of the device should be positioned at the midpoint of the well screen interval. The device should be installed slowly to minimize turbulence within the water in the casing and mixing of stagnant water above the screened interval with water in the screened interval. Following installation, the flow controller should be connected to the sample collection device and the flow-through cell connected to the outlet of the sample collection device. The calibrated groundwater chemistry monitoring probes should be installed in the flow-through cell. If a flow meter is used, it should be installed ahead of the flow-through cell.

If the well has a dedicated sample collection device, the controller for the sample collection device should be connected to the sample collection device. The flow meter and flow-through cell should be connected in line to the discharge tube, and the probes installed in the flow-through cell.

The controller should be activated and groundwater extracted (purged) from the well. The purge rate should be monitored, and should not exceed the capacity of the well. The well capacity is defined as the



Date/Time _____ Spec. Conductance: Standard _____ $\mu\text{mhos/cm}$ at 25°C Reading _____ $\mu\text{mhos/cm}$ at _____ $^{\circ}\text{C}$
 pH: pH 4.00 - _____ at _____ $^{\circ}\text{C}$ pH 7.00 - _____ at _____ $^{\circ}\text{C}$ pH 10.00 - _____ at _____ $^{\circ}\text{C}$ Slope _____
 Dissolved Oxygen: D.O. Meter _____ mg/L at _____ $^{\circ}\text{C}$ PID: Calibration Gas _____ PPM Span _____ Reading _____

pH Meter _____	Serial Number _____	Fractions _____
Spec. Cond. Meter _____	Serial Number _____	_____
Pump _____	Serial Number _____	_____
Water Level Meter _____	Serial Number _____	Number of Bottles _____
D.O. Meter _____	Serial Number _____	Sample Depth _____
Filter Apparatus _____	Filters _____	Field Notebook _____
Temperature Measure _____	_____	Sample Method _____
Interface Probe _____	Serial Number _____	_____
PID/OVA _____	Serial Number _____	Discharge Water Containerized <input type="checkbox"/> Yes <input type="checkbox"/> No

1.0 BACKGROUND

The field logbook should contain detailed records of all the field activities, interviews of people, and observations of conditions at a site. Entries should be described in as much detail as possible, so that personnel can accurately reconstruct the activities and events which have taken place during field assignments. Field logbooks are considered accountable documents in enforcement proceedings and may be subject to review. Therefore, the entries in the logbook must be accurate, detailed, and reflect the importance of the field events.

1.1 PURPOSE

The purpose of this standard operating procedure (SOP) is to provide guidance to ensure that logbook documentation for any field activity is correct, complete, and adequate. Logbooks are used for identifying, locating, labeling, and tracking samples. A logbook should document any deviations from the project approach, work plans, quality assurance project plans, health and safety plans, sampling plans, and any changes in project personnel. They also serve as documentation of any photographs taken during the course of the project. In addition, the data recorded in the logbook may assist in the interpretation of analytical results. A complete and accurate logbook also aids in maintaining good quality control. Quality control is enhanced by the proper documentation of all observations, activities, and decisions.

1.2 SCOPE

This SOP establishes the general requirements and procedures for recording notes in the field logbook.

1.3 DEFINITIONS

None

1.4 REFERENCES

Compton, R.R. 1985. *Geology in the Field*. John Wiley and Sons. New York, N.Y.

- All field activities, meetings, photographs, and names of personnel must be recorded in the site logbook.
- All logbooks pertaining to a site or subsite should be assigned a serial number based on the date the logbook is issued to the project manager. The first logbook should be assigned number 1, the next logbook issued assigned number 2, and so on. The project manager is to maintain a record of all logbooks issued under the project.
- All information must be entered with a ballpoint pen with waterproof ink. Do not use pens with "wet ink," because the ink may wash out if the paper gets wet. Pencils are not permissible for field notes because information can be erased. The entries should be written dark enough so that the logbook can be easily photocopied.
- Do not enter information in the logbook that is not related to the project. The language used in the logbook should be factual and objective.
- Begin a new page for each day's notes.
- Write notes on every line of the logbook. If a subject changes and an additional blank space is necessary to make the new subject title stand out, skip one line before beginning the new subject. Do not skip any pages or parts of pages unless a day's activity ends in the middle of a page.
- Draw a diagonal line on any blank spaces of four lines or more to prevent unauthorized entries.

2.2 LOGBOOK FORMAT

The layout and organization of each field logbook should be consistent with other field logbooks.

Guidelines for the cover, spine, and internal pagination are discussed below.

2.2.1 FORMAT OF FIELD LOGBOOK COVER AND SPINE

Write the following information in clear capital letters on the front cover of each logbook.

- Logbook identification number (assigned by the DCA)
- The serial number of the logbook (assigned by the project manager)
- Name of the site, city, and state

- Names of personnel present at the site. Note the affiliation(s) and designation(s) of all personnel.
- Equipment calibration and equipment models used.
- Changes in instructions or activities at the site.
- Levels of personal protective clothing and equipment.
- A general title of the first task undertaken (for example, well installation at MW-11, decon at borehole BH-11, groundwater sampling at MW-11).
- Provide an approximate scale for all diagrams. If this can't be done, write "not to scale" on the diagram. Indicate the north direction on all maps and cross-sections. Label features on each diagram.
- Corrections should be made by drawing a single line through the entry being corrected. Initial and date any corrections made in the logbook.
- The person recording notes is to initial each page after the last entry. No information will be entered in the area following these initials.
- At the end of the day, the person recording notes is to sign and date the bottom of the last page. Indicate the end of the work day by writing "Left site at (time)." A diagonal line will be drawn across any blank space to the bottom of the page.

The following information should be recorded in the logbook after taking a photograph:

- Time, date, location, direction, and if appropriate, weather conditions
- Description of the subject photographed and the reason for taking the picture
- Sequential number of the photograph and the film roll number (if applicable)
- Name of the photographer

The following information should be entered into the logbook when taking samples:

- Location description
- Names of samplers
- Collection time
- Designation of samples as a grab or composite sample
- Type of sample (water, sediment, soil gas, etc.)

SOP APPROVAL FORM

Tetra Tech EM, Inc.

STANDARD OPERATING PROCEDURE

SAMPLE PRESERVATION AND MAXIMUM HOLDING TIMES

SOP NO. 016

AVAILABLE UPON REQUEST

APPENDIX B

MONITORING WELL INSTALLATION RECORD

SURFACE COMPLETION

ABOVE GROUND ☐

FLUSH MOUNT ☐

PROTECTIVE CASING

TYPE:

SURFACE SEAL
TYPE:

STICK UP: _____

WELL INFORMATION:

WELL NO.:

BOREHOLE NO.:

SITE:

SUBSITE:

DRILLING INFORMATION:

DRILLING COMPANY:

DRILLING METHOD:

DRILLING DATES:

INSTALLATION DATES:

WATER ADDED DURING DRILLING:

YES ☐

GALLONS:

NO ☐

CENTRALIZERS:

YES ☐

DEPTH(S):

NO ☐

BOTTOM OF WELL

DEPTH: _____

GROUT

FROM _____ TO _____ FEET (BGS)

FORMULATION:

QUANTITY:

RISER CASING

FROM _____ TO _____ FEET (BGS)

MATERIAL:

DIAMETER:

BENTONITE SEAL

FROM _____ TO _____ FEET (BGS)

MATERIAL:

QUANTITY:

FILTER PACK

FROM _____ TO _____ FEET (BGS)

MATERIAL:

QUANTITY:

SCREEN

FROM _____ TO _____ FEET (BGS)

MATERIAL:

DIAMETER:

SLOT SIZE:

BOTTOM CAP

TYPE:

BOREHOLE DEPTH: _____

BOREHOLE DIAMETER: _____ BACKFILL MATERIAL:

DEPTHS MEASURED IN
FEET BELOW GROUND SURFACE (BGS)

Tt Tetra Tech EM Inc.



Sheet of

WELL DEVELOPMENT DATA SHEET

BORING NO. _____

WELL NO. _____

Project _____
 Project No. _____
 Date(s) of Installation _____
 Date(s) of Development _____
 Personnel/Company _____
 Type of Rig Used _____

Casing Diameter/Type _____
 Borehole Diameter _____
 Screened Interval(s) _____
 Total Length of Well Casing _____
 Measured Total Depth (TOC) Initial _____
 Final _____
 Initial Depth to Water
 (TOC) _____ Date _____ Time _____
 Stabilized Depth to Water
 (TOC) _____ Date _____ Time _____

TECHNIQUE(S)	DEVELOPMENT	
		EQUIPMENT TYPE/CAPACITY
1. Visual inspection		
2. Penetrant testing		
3. Magnetic particle testing		
4. Radiography		
5. Ultrasonic testing		
6. Eddy current testing		
7. Thermography		
8. Acoustic emission		
9. Vibration analysis		
10. Laser Doppler velocimetry		
11. Photoelasticity		
12. Strain gauging		
13. Holographic interferometry		
14. Digital image processing		
15. Finite element analysis		
16. Fracture mechanics		
17. Stress corrosion cracking		
18. Fatigue crack growth		
19. Creep rupture		
20. Corrosion rate		
21. Electrochemical impedance spectroscopy		
22. Potentiodynamic polarization		
23. Tafel extrapolation		
24. Linear sweep voltammetry		
25. Cyclic voltammetry		
26. Chronoamperometry		
27. Chronopotentiometry		
28. Galvanostatic cycling		
29. Potentiostatic cycling		
30. Impedance spectroscopy		
31. Nyquist plots		
32. Bode plots		
33. Kramers-Kronig relations		
34. Warburg impedance		
35. Double layer capacitance		
36. Charge transfer resistance		
37. Exchange current density		
38. Tafel slope		
39. Cathodic reduction potential		
40. Anodic oxidation potential		
41. Redox potential		
42. Standard electrode potential		
43. Nernst equation		
44. Butler-Volmer equation		
45. Arrhenius equation		
46. Arrhenius plot		
47. Logarithmic correlation		
48. Power law correlation		
49. Exponential correlation		
50. Linear correlation		
51. Quadratic correlation		
52. Cubic correlation		
53. Quartic correlation		
54. Quintic correlation		
55. Sextic correlation		
56. Septic correlation		
57. Octic correlation		
58. Nonic correlation		
59. Decic correlation		
60. Eleventh degree correlation		
61. Twelfth degree correlation		
62. Thirteenth degree correlation		
63. Fourteenth degree correlation		
64. Fifteenth degree correlation		
65. Sixteenth degree correlation		
66. Seventeenth degree correlation		
67. Eighteenth degree correlation		
68. Nineteenth degree correlation		
69. Twentieth degree correlation		
70. Twenty-first degree correlation		
71. Twenty-second degree correlation		
72. Twenty-third degree correlation		
73. Twenty-fourth degree correlation		
74. Twenty-fifth degree correlation		
75. Twenty-sixth degree correlation		
76. Twenty-seventh degree correlation		
77. Twenty-eighth degree correlation		
78. Twenty-ninth degree correlation		
79. Thirtieth degree correlation		
80. Thirty-first degree correlation		
81. Thirty-second degree correlation		
82. Thirty-third degree correlation		
83. Thirty-fourth degree correlation		
84. Thirty-fifth degree correlation		
85. Thirty-sixth degree correlation		
86. Thirty-seventh degree correlation		
87. Thirty-eighth degree correlation		
88. Thirty-ninth degree correlation		
89. Fortieth degree correlation		
90. Forty-first degree correlation		
91. Forty-second degree correlation		
92. Forty-third degree correlation		
93. Forty-fourth degree correlation		
94. Forty-fifth degree correlation		
95. Forty-sixth degree correlation		
96. Forty-seventh degree correlation		
97. Forty-eighth degree correlation		
98. Forty-ninth degree correlation		
99. Fiftieth degree correlation		
100. Fifty-first degree correlation		
101. Fifty-second degree correlation		
102. Fifty-third degree correlation		
103. Fifty-fourth degree correlation		
104. Fifty-fifth degree correlation		
105. Fifty-sixth degree correlation		
106. Fifty-seventh degree correlation		
107. Fifty-eighth degree correlation		
108. Fifty-ninth degree correlation		
109. Sixtieth degree correlation		
110. Sixty-first degree correlation		
111. Sixty-second degree correlation		
112. Sixty-third degree correlation		
113. Sixty-fourth degree correlation		
114. Sixty-fifth degree correlation		
115. Sixty-sixth degree correlation		
116. Sixty-seventh degree correlation		
117. Sixty-eighth degree correlation		
118. Sixty-ninth degree correlation		
119. Seventieth degree correlation		
120. Seventy-first degree correlation		
121. Seventy-second degree correlation		
122. Seventy-third degree correlation		
123. Seventy-fourth degree correlation		
124. Seventy-fifth degree correlation		
125. Seventy-sixth degree correlation		
126. Seventy-seventh degree correlation		
127. Seventy-eighth degree correlation		
128. Seventy-ninth degree correlation		
129. Eightieth degree correlation		
130. Eighty-first degree correlation		
131. Eighty-second degree correlation		
132. Eighty-third degree correlation		

☐ Jetting (Airlift) _____
☐ Surge Block _____
☐ Bailing _____
☐ Pumping _____
☐ Other _____

FLUIDS ADDED

Lost Drilling Fluid: _____ Gallons
 Lost Purge Water: _____ Gallons
 Water During Installation: _____ Gallons
 Total Fluids Added: _____ Gallons
 Source of Added Water: _____
 Ground Water Quality Parameters of
 Added Water Measured: Y N
 Sample Collected of Added Water: Y N
 Sample Designation of Added Water:

PURGE VOLUME CALCULATION

Casing Volume: _____ Ft. of water
 x _____ Gallons/Foot
 = _____ Gallons per Single Casing Volume
 Sand Pack Volume: _____ Ft. of Saturated Sand Pack
 x _____ Gallons/Foot (borehole diameter)
 = _____ Gallons (in borehole)
 - _____ Gallons of Casing Volume
 = _____ x 0.3 (Assuming porosity = 30%)
 = _____ Gallons Within Sand Pack

Single Purge Volume: _____ Gallons (Casing Vol. +
 Sand Pack Vol. + Fluids Added)

Minimum Purge Volume: _____ Gallons

Actual Purge Volume: _____ Gallons

Volume Measured by: _____

Rate of Development _____ Gallons/Minute (Hour, Day)

Pumping Rate/Depth _____ @ _____ Ft. (Below Grd.)

Immiscible Phases Present: Y N Thickness _____

INSTRUMENT CALIBRATION

pH Meter: _____ Spec. Conductance Meter: _____
 pH 4.0 = _____ @ _____ °C Standard _____ $\mu\text{mhos/cm}$ @ 25°C
 pH 7.0 = _____ @ _____ °C Reading _____ $\mu\text{mhos/cm}$ @ _____ °C
 pH 10.0 = _____ @ _____ °C Turbidity Meter: _____
 Dissolved Oxygen Meter: _____ Other: _____

[illegible]

Development Completed at _____ Gallons Discharged. Date: _____ Time: _____
Criteria: _____ Personnel: _____

* Specific Conductance readings temperature compensated to 25°C, if not, report temperatures at which reading obtained.

APPENDIX C

TIEMI ELECTRONIC DATA DELIVERABLE FORMAT

RESULTS THAT SHALL BE INCLUDED IN ALL ELECTRONIC DATA DELIVERABLES:

- 1) **TARGET ANALYTE** results for each sample and associated analytical methods requested on the TiEMI chain-of-custody (COC) form.
- 2) **TENTATIVELY IDENTIFIED COMPOUND (TIC)** results reported for the Contract Laboratory Program (CLP) volatile organics analyses (VOA) and CLP semivolatile organics analyses (SVOA).
- 3) The **METHOD AND INSTRUMENT BLANKS** (typically, organic analyses) and **PREPARATION AND CALIBRATION BLANKS** (typically, inorganic analyses) results reported for the sample delivery group (SDG).
- 4) Percent recoveries for the spike compounds in the **MATRIX SPIKES (MS)**, **MATRIX SPIKE DUPLICATES (MSD)** (organics analyses only), **BLANK SPIKES** (typically, organics analyses), and/or **LABORATORY CONTROL SAMPLES (LCS)** (typically, inorganics analyses) (see "Matrix Spikes and Matrix Spike Duplicates" below).
- 5) **MATRIX DUPLICATE results** (inorganics analyses) reported for the SDG form (do not report the relative percent differences [RPD] [see "Matrix Duplicates" below]).
- 6) The **PERCENT MOISTURE** and/or the **PERCENT SOLIDS** results for each solid sample; this determination shall be made once for each solid sample listed on the TiEMI COC. The results for these determinations shall be reported in the same manner as all other target analyte results (see "Percent Moisture/Solids Determinations" below).
- 7) All **REANALYSES, REEXTRACTIONS, or DILUTIONS** reported for the SDG, including those associated with samples and the specified laboratory quality control (QC) samples.

RESULTS THAT SHALL NOT NORMALLY BE INCLUDED IN ALL EDD:

ORGANICS NO results from surrogate spikes or calibration standards shall be reported electronically.

INORGANICS NO results from serial dilutions, analytical/postdigestion/distillation spikes, or calibration standards shall be

SUPPLEMENTAL EDD: When the project order is initially placed with the laboratory, at no additional cost to TiEMI, a supplemental file--containing surrogate spikes recoveries, serial dilutions (% difference), analytical spike recoveries, and post digestion/distillation spike recoveries--may be requested at the discretion of the TiEMI technical contact (project chemist).

reported electronically.

FIXED LENGTH RECORD FILE SPECIFICATION

T(EM) Electronic Deliverable File Specification			
Field Name	Width	Columns	Format
LABSID	12	1-12	
SDGNUM	8	13-20	
SMPTYPE	5	21-25	
CLIENTSID	30	26-55	
MATRIX	6	56-61	
ANALYTE	30	62-91	
REPLIM	11	92-102	999999.9999
RESULT	15	103-117	999999999.9999
QUAL	7	118-124	
CLPMQUAL	4	125-128	
UNITS	10	129-138	
SAMPDATE	10	139-148	MM/DD/YYYY
EXTDATE	10	149-158	MM/DD/YYYY
ANLYDATE	10	159-168	MM/DD/YYYY
ANLYGRP	10	169-178	
ANLYMETH	35	179-213	
TIC	1	214-214	
RETENTIME	7	215-221	9999.99
CASNO	11	222-232	
RCVDDATE	10	233-242	MM/DD/YYYY
LABCODE	5	243-247	
DILFACT	9	248-256	999999.99
SMPWTVOL	10	257-266	999999.999
SURROGATE	1	267-267	
QCBATCH	12	268-279	

<u>FIELD NAME</u>	<u>REQUIRED</u>	<u>DEFINITION</u>
ANALYTE	Yes	Name of each target analyte or parameter for which the analytical method was run. Inorganic complexes results shall be reported so as to specify the an alyte or complex the results are reported as. For example, total alkalinity as CaCO_3 , sulfate as S, nitrate as N, hardness as CaCO_3 , etc.
REPLIM	Cond	<u>Adjusted</u> required quantitation/detection limit as listed in Table A -I-1 of the Statement Of Work (SOW). This field shall be calculated as defined in "Required Data Codes and Calculations". The calculation corrects for changes in the dilution factor, sample weight or volume, percent moisture or percent solid, and extract volume (when applicable). <u>REPLIM is considered an essential piece of information and shall always be reported</u> . For the volatiles analysis, TICs shall have a quantitation limit of the target analytes in that analytical run. For the semivolatiles analysis, TICs shall have a quantitation limit of the <u>nonphenolic</u> target analytes in that analytical run.
RESULT	Yes	Concentration of the target analyte or the recorded measurement of the physical parameter
QUAL	Cond	Laboratory qualifiers (if any) associated with each result; for CLP methods, the qua lifiers shall be only those allowed by the EPA SOWs. In the special case of CLP inorganic analyses, this field shall contain the concatenation of any applicable CLP concentration qualifier (that is "B" or "U") plus any applicable CLP result qualifier(s) (that is, "E", "M", "N", "S", "W", "+", or "+"). For some-non CLP analytical methods, such as pH, this field is not applicable.
CLPMQUAL	Cond	CLP inorganic method qualifier only; this field shall be completed with only the codes allowed by the EPA SOW (that is, "P", "A", "F", "PM", "AM", "FM", "CV", "AV", "CA", "AS", "C", "T", or "NR").
UNITS	Cond	Unit of measure in which the result is reported. The most common entries in this field shall be "MG/KG", "UG/KG", "MG/L", and "UG/L". This field shall <u>NOT</u> contain "PPM" or "PPB". For laboratory QC samples, the UNITS may also be "%REC", for percent recovery, or "%DIF", for percent difference (only for serial dilutions and only reported in a supplemental EDD). Percent moisture analyses shall be expressed in UNITS of "%MST", for percent moisture, or "%SLD", for percent solid. Units for salinity shall be expressed as SALIN. Unless otherwise stated in the project order issued by TiEMI, the units shall be the same as listed in Table A -I-1 of the SOW. This field must be completed, except for pH and salinity analyses. Refer to Table A -I-1 for units.

SURROGATE	Yes	For all standard EDDs this field shall contain an "N", indicating that the result is not from a surrogate spike.
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SUPPLEMENTAL EDD: If a supplemental EDD has been requested, and the RESULT being reported is an analyte of a surrogate spike, this field shall contain a "Y", indicating a surrogate spike recovery.

QCBATCH	Cond	Laboratory QC batch ID, which some laboratories use to associate blanks and other laboratory QC samples with their respective "real" samples. If the laboratory uses this type of QC batch ID, it shall be reported electronically in this field.
---------	------	---

REQUIRED DATA CODES AND CALCULATIONS

SMPTYPE	<u>Code</u>	<u>Sample</u>
	ORIG	- Original analysis of the sample
	DL	- Diluted analysis of the sample
	RE	- Reextracted or reanalyzed sample
	REDL	- Diluted analysis of a re-extracted or reanalyzed sample
	MBLK	- Method blank or preparation blank
	MS	- Matrix spike recovery (both organic and inorganic analyses)
	MSD	- Matrix spike duplicate recovery (organic analyses only)
	MD	- Matrix duplicate (inorganic analyses only)
	LCS	- Blank spike or LCS recovery
	IBLK	- Instrumental blank (organic analyses)
	CBLK	- Calibration blanks (initial and continuing for inorganic analyses)

SUPPLEMENTAL EDD: If a supplemental EDD is requested, the following additional codes shall be used to identify results from serial dilutions, analytical spikes, and postdigestion/distillation spikes.

SMPTYPE	<u>Code</u>	<u>Sample</u>
	SDIL	- Serial dilution percent difference
	ASPK	- Analytical spike recovery
	PDIG	- Postdigestion/distillation spike recovery

O&G	-	Oil and grease
TRPH	-	TRPH
ORGPB	-	Organic lead
CHROM	-	Hexavalent chromium
TOX	-	Total organic halides
ANION	-	Major anions, nitrite - N/nitrate N, ortho-phosphate P
SOLIDS	-	TDS and TSS
TKN	-	TKN
MBAS	-	MBAS
TOC	-	TOC
REACT	-	Reactivity
ASULFIDE	-	Acid sulfides
CATION	-	Cation exchange capacity
AMMON	-	Ammonia as nitrogen
TPHOS	-	Total phosphorus
SULFIDE	-	Sulfide
HYDRAZINE	-	Hydrazine
FLSHPT	-	Flash point
PH	-	pH
ALKALN	-	Alkalinity
COND	-	Conductivity
SALIN	-	Salinity
TURBIDITY	-	Turbidity
OXYD	-	BOD, COD
PCTMST	-	Percent moisture
HARD	-	Hardness
ACID	-	Acidity
LABCODE	-	To be determined based on the selected laboratories.

NOMENCLATURE FOR LABORATORY QUALITY CONTROL SAMPLES

The CLIENTSID for laboratory QC samples shall be constructed by using the following nomenclature. This nomenclature is similar to the nomenclature in the EPA CLP SOW for organics and inorganics analyses. In the nomenclature presented below, "X...X" represents the complete client sample ID, as indicated on the TiEMI COC form. The letter "Z" represents any single alphabetical character chosen by the subcontractor, and the letter "A" represents any single alphabetical character or digit chosen by the subcontractor. All other characters or digits are literal strings that must be included in the CLIENTSID exactly as shown below.

For TCLP or WET extractions, the MATRIX field shall contain "TCLP" or "WET", respectively. The EXTDATE shall contain the date of the extraction, if any, for the principal analytical method used and **NOT** the TCLP or WET extraction date. For example, if a TCLP SVOA analysis is requested, the EXTDATE shall contain the date of the SVOA extraction —not the TCLP extraction date. The ANLYGRP shall be chosen from the list presented above but shall be preceded with a "T" (for TCLP extraction) or "W" (for WET extraction) and separated by a dash. The ANLYMETH shall contain only the principal method used to conduct the analysis. The SMPTYPE shall contain the applicable code from the list presented above but shall be preceded by an "L" (indicating a TCLP or WET [L]eachate). The CLIENTSID shall be constructed as described in the section entitled "Nomenclature for Laboratory Quality Control Samples".

As an example of how to electronically report TCLP data, if sample X...X is submitted for SVOA and TCLP SVOA analyses, the following fields shall be completed as shown:

Regular sample:

<u>Sample Description</u>	<u>CLIENTSID</u>	<u>ANLYGRP</u>	<u>SMPTYPE</u>	<u>MATRIX</u>	<u>ANLYMETH</u>
Original sample	X...X	SVOA	ORIG	SOIL	EPA ORGANICS SOW - ROUTINE (1994)
MS on X...X	X...XMS	SVOA	MS	SOIL	EPA ORGANICS SOW - ROUTINE (1994)
MSD on X...X	X...XMSD	SVOA	MSD	SOIL	EPA ORGANICS SOW - ROUTINE (1994)
SVOA method blank	SBLK01	SVOA	BLK	SOIL	EPA ORGANICS SOW - ROUTINE (1994)

TCLP sample:

<u>Sample Description</u>	<u>CLIENTSID</u>	<u>ANLYGRP</u>	<u>SMPTYPE</u>	<u>MATRIX</u>	<u>ANLYMETH</u>
TCLP of	X...X X...XT	T-SVOA	LORIG	TCLP	EPA ORGANICS SOW - ROUTINE (1994)
MS on TCLP	X...XTMS	T-SVOA	LMS	TCLP	EPA ORGANICS SOW - ROUTINE (1994)
MSD on TCLP	X...XTMSD	T-SVOA	LMSD	TCLP	EPA ORGANICS SOW - ROUTINE (1994)
TCLP blank	TBLK01	T-SVOA	LMBLK	TCLP	EPA ORGANICS SOW - ROUTINE (1994)

<u>Description</u>	<u>CLIENTSID</u>	<u>ANLYGRP</u>	<u>SMPTYPE</u>	<u>MATRIX</u>	<u>ANLYMETH</u>
TCLP dup. of X...X	X...XTD	T-SVOA	LMD	TCLP	EPA ORGANICS SOW - ROUTINE (1994)

PERCENT MOISTURE/SOLIDS DETERMINATIONS

The results of the percent moisture or percent solids determination shall be reported just like the results of any analytical method. The following fields shall be completed as specified. The ANALYTE field shall contain the character string "PERCENT MOISTURE" or "PERCENT SOLIDS" (whichever is applicable). The SMPTYPE field shall contain the character string "ORIG" (see "Required Data Codes and Calculations"). The ANLYGRP field shall contain the character string "PCTMST", and the UNITS field shall contain the percent sign (%) plus the character string

SUPPLEMENTAL EDD

If the TiEMI technical contact (project chemist) requests a supplemental EDD, the subcontractor shall electronically report the following additional laboratory QC results, if applicable:

- Surrogate spike recoveries
- Serial dilutions
- Analytical spike recoveries
- Postdigestion/distillation recoveries

Serial dilutions shall be reported as the percent difference with units "%DIF." All other recoveries shall be reported as a percent recovery with units "%REC."

These additional samples and their results shall be delivered as a separate file; however, they shall be in the same fixed length record file format, and contain the same fields, as described in the standard EDD. Refer to specific instructions throughout this EDD Specification. These instructions can be found in text boxes labeled "Supplemental EDD".

QUALITY MANUAL ADDENDUM

Prepared by Pace Analytical Services, Inc.

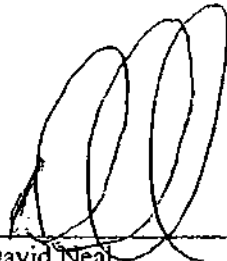
Kansas Laboratory

9608 Loiret Blvd.

Lenexa, Kansas 66219

(913) 599-5665

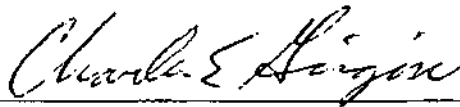
APPROVAL



David Neal
General Manager

5-20-02

Date



Charles E. Girgin
Quality Assurance Officer

5/16/02

Date

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Attachment A: Kansas Laboratory Floor Plan

Attachment B: Organization Chart

Attachment C: Instrumentation List

Attachment D: NELAP certification & State certification list

Attachment E: Corrective Action Report

Attachment F: Methods and Minimum Reporting Limits

Attachment G: SOP Directory

Official Correspondence and Authorized Signatures

Pace Kansas maintains a copy of each employee's signature and initials on file in the QA office.

The personnel authorized to sign client reports and official Pace correspondence are the following positions: General Manager, Client Services Manager, Project Manager and Quality Assurance Officer (QAO). Currently, these positions are being held by:

General Manager	David Neal
Client Services Manager	Mary Jane Walls
Project Manager	Angie Brown
	Connie Gardener
	Chris Scharff
	Brad Godwin
	Adam Taylor
Quality Assurance Officer	Charles Girgin

Reporting Options offered by Pace Kansas

Pace Kansas offers a variety of reporting options to our clients. Due to the time and effort required, Pace Kansas does not offer customized report formats. Electronic Data Deliverables (EDD) are also available in a variety of formats.

EPIC Report:

This is the standard report provide by Pace. An EPIC report includes all the results for the samples including Quality Control samples, units, Pace Reporting Limit (PRL), date analyzed, analyst, CAS # and footnotes. Also included with the report are the invoice, cooler receipt form and chain of custody.

Projects that require supplemental information for data validation are available in the following formats

- Level A: EPIC report, Narrative
- Level B: EPIC report, Narrative, Raw Data
- Level C: EPIC report, Narrative, Quality Control Forms
- Level D: EPIC report, Narrative, Raw Data, Quality Control Forms

Corrective Action

When a quality assurance problem occurs, the analyst determines the nature of the discrepancy and alerts their supervisor. The appropriate corrective action is determined and implemented. This may include but is not restricted to re-analysis and/or re-extraction, instrument maintenance, preparation of new calibration standards, and preparation of a new calibration curve. If all attempts at corrective action fail the Quality Assurance Officer and Laboratory Manager are contacted. The samples are flagged on the final report. Regardless of the outcome of the corrective action, the event is documented in the discrepancy report database. The following sections address individual circumstances that require corrective action and the possible steps to be taken.

Corrective action for Initial/Continuing Calibration

1. Check calculation and/or integration for possible errors
2. Re-analyze the calibration standard or calibration curve
3. Prepare fresh standard solutions
4. Instrument maintenance

Corrective action for unacceptable PE (performance evaluation) samples

Upon receipt of a unacceptable PE the QAO notifies the department supervisor by e-mail. The e-mail includes the information on the failed PE and a corrective action form (attachment E). The supervisor then institutes a thorough investigation and initiates any corrective action required. The completed corrective action form is e-mailed to the QA department for review.

Corrective action for surrogate failures

Monitoring of surrogate recoveries is done by the analyst in real time to insure consistency and data quality on a sample by sample basis. If a recovery of any surrogate falls outside of the laboratory accepted criteria the sample is initially re-analyzed. If the recovery for the re-analysis is still outside the control limits, the sample is re-prepared/extracted and re-analyzed. If the sample falls within the control limits the in-control sample is reported. If the sample is still outside the control limits the data is reported and the final report is footnoted to inform the client of the discrepancies.

Management Review of the Quality System

The general manager will review the quality system and its testing and calibration activities to ensure its continuing suitability and effectiveness and to introduce any necessary changes or improvements in the quality system and laboratory operation on an annual basis. The review will take into account the quarterly quality reports, outcome of recent internal and external audits, the results of proficiency test, any changes in the volume and type of work undertaken, feedback from clients, corrective actions, and ongoing interaction with laboratory staff. Once the review is completed, a report will be generated and distributed to the senior staff. Records will be maintained in the Quality Assurance Office as feedback to the Quarterly Quality Report.

Microbiology and Aquatic Toxicity Testing

The Southeast Kansas Service Center of Pace Analytical Services, Inc. Kansas Laboratory is an environmental testing facility committed to providing our clients with the highest quality data and unequalled customer service in the area of microbiology and aquatic toxicity. Located in Frontenac, Kansas, the laboratory holds the State of Kansas NELAP certification. The following tasks are required for microbiology and Wet toxicity testing. All other procedural tasks are listed in the specific SOP for the species of interest. The species tested are listed on the wastewater NELAP certification parameter list in Attachment D.

Required Tasks

Listed in this section are the tasks that must be performed at the specific interval in order to ensure accurate bacteriological testing.

Record temperatures. Record temperatures of the fecal coliform water bath, the total coliform incubator, and the bacteria refrigerator in the morning and afternoon of each working day.

pH Meter calibration. At the beginning of each working day, calibrate pH meter using pH 7.0, and 10.0 buffers according to the meter manufacturer's instructions. Record details of the calibration in the calibration logbook.

Water check for pH and conductivity. Check the laboratory deionized water (the water used for bacteria analyses) at the beginning of each working day for pH and specific conductance. Specific conductance of the water should be $< 2 \mu\text{mho/cm}$; pH of the water should be between 5.5 and 7.5. If these criteria are not met, notify the laboratory/quality assurance manager immediately.

Balance calibration. The calibration of the analytical balances should be checked at The beginning of each working day to insure that they are operating properly. The data is recorded in the Balance Calibration Logbook.

Balance calibration. The weekly balance calibration procedure is the same as the daily procedure, except all of the working Class S weights are checked, rather than just two.

AS NEEDED

1. **Check fecal media.** Each time fecal media is made, check the pH. pH should be in the range of 7.4 ± 0.2 . Record pH in the Bacteria Preparation and Sterilization Logbook. With each new batch of fecal media, run a media check blank as described in fecal coliform procedure.
2. **Clean fecal water bath, incubator, refrigerator and sterilizer.**
3. **Sterilize items needed for fecal coliform analysis.** Record pertinent information in the Autoclave Logbook.
4. **Prepare buffer dilution water for bacterial analysis.** Sterilize and record in the Sterility Check Logbook.
5. **Prepare plate count agar.** Sterilize and record in the Sterility Check Logbook.

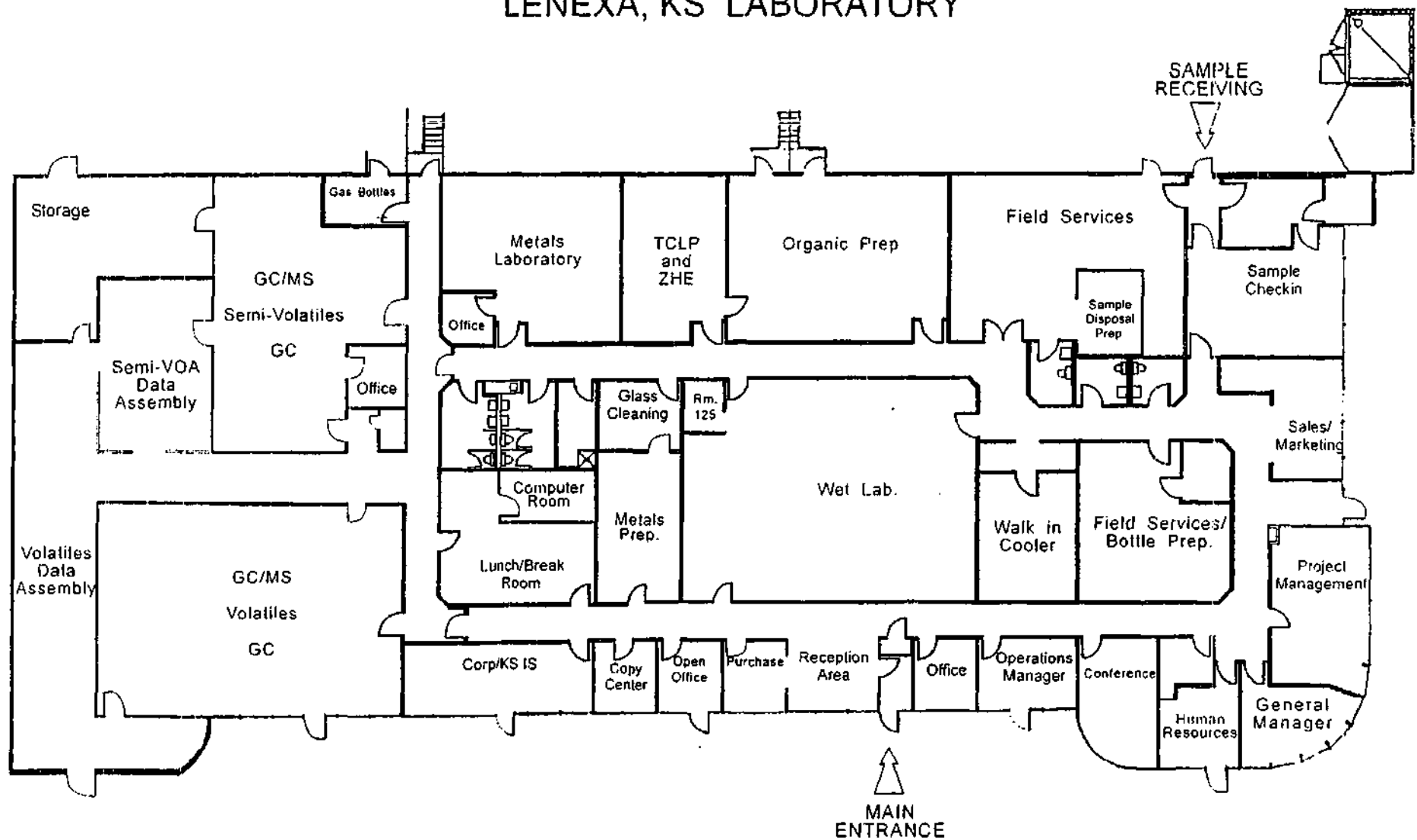
SAMPLE COLLECTION, PRESERVATION AND HANDLING FOR MICROBIOLOGY

- A. The sample should be collected in a sterile Whirl pack, plastic or glass bottle and stored at $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$ until analysis is initiated.
- B. Chlorinated samples must be preserved with 0.1 ml of 10% sodium thiosulfate per 100 ml sample or equivalent. PACE sample containers for fecal coliform analysis have this preservative added prior to distribution to samplers.
- C. Ideally, analysis should begin within six hours of sampling whenever possible. Because of geographical and shipping constraints, that it is not possible for some samples. For these samples, analysis should begin within 30 hours of sampling. Results for these samples must be flagged with the statement "Fecal coliform analysis initiated more than 6 hours but less than 30 hours following sample collection." Results from sample analyses initiated more than 30 hours following sample collection are not considered valid.

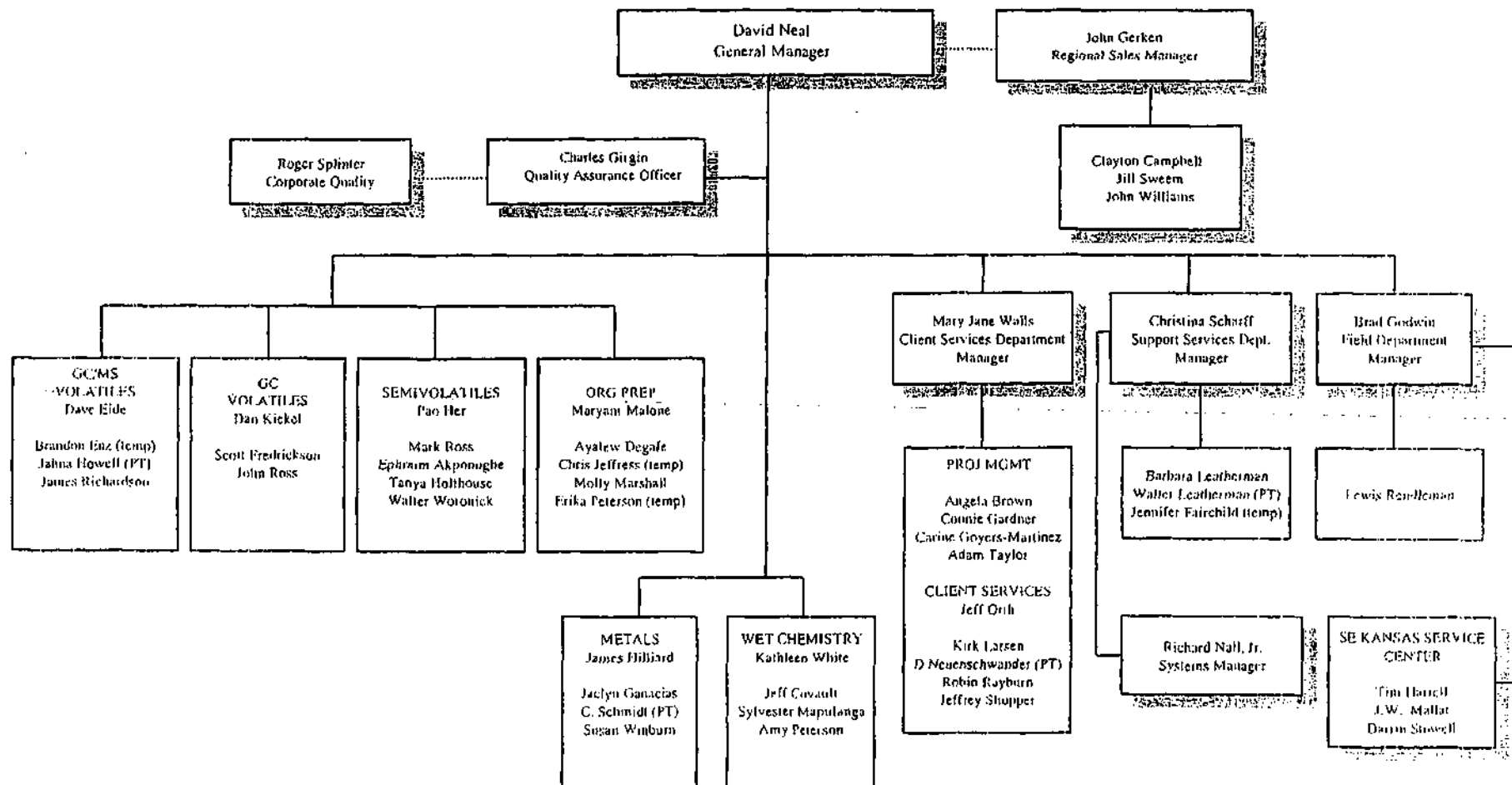
SAMPLE COLLECTION, PRESERVATION AND HANDLING FOR AQUATIC TOXICITY

- A. Samples must be collected in a plastic cubing container and stored on ice until use. The test should be initiated no later than 36 hours from the date and time of collection.

PACE ANALYTICAL SERVICES, INC. LENEXA, KS LABORATORY



KANSAS



PACE ANALYTICAL KANSAS CITY LABORATORY EQUIPMENT LIST - 1/2002

<u>INSTRUMENT</u>	<u>MANUFACTURER</u>	<u>MODEL NUMBER</u>	<u>DETECTOR</u>	<u>ANALYSIS</u>	<u>DATE PURCH.</u>
GS/MS	Finnigan	INCOS 50	MS	625/8270	Jan-87
GS/MS	Hewlett-Packard	5972	MSD	524/624/8260	Sep-93
GS/MS	Hewlett-Packard	5972	MSD	524/624/8260	Sep-93
GS/MS	Finnigan	INCOS 50	MS	625/8270	Jan-87
GC/MS	Hewlett-Packard	5972	MSD	625/8270	Jan-99
GC/MS	Hewlett-Packard	5972	MSD	8260	Dec-98
GC/MS	Hewlett-Packard	5972	MSD	8260	Jan-99
Gas Chromatographs	Hewlett-Packard	5890	ECD/ECD	8082	May-93
Gas Chromatographs	Hewlett-Packard	5890	ECD/ECD	8082	Jun-93
Gas Chromatographs	Hewlett-Packard	5890	ECD/ECD	8081/8151/8011	Dec-90
Gas Chromatographs	Hewlett-Packard	5890	PID//Hall	8021 UST	Aug-92
Gas Chromatographs	Hewlett-Packard	5890	PID//Hall	8021 UST	Jun-90
Gas Chromatographs	Hewlett-Packard	5890	PID/FID	8021/8015 UST	Mar-91
Gas Chromatographs	Hewlett-Packard	5890	ECD/ECD	8151	Jun-87
Gas Chromatographs	Hewlett-Packard	5890	PID/FID	8021/8015 UST	Mar-91
Gas Chromatographs	Hewlett-Packard	5890	PID/FID	8021/8015 UST	Mar-91
Gas Chromatographs	Hewlett-Packard	5890	PID//Hall	8021 UST	Mar-91
Gas Chromatographs	Hewlett-Packard	5890	NPD/NPD	8141	Mar-91
Gas Chromatographs	Hewlett-Packard	5890	FID	8015 Mod/OA2	Mar-93
Gas Chromatographs	Hewlett-Packard	5890	FID	8015 Mod/TX 1005	Mar-91
Gas Chromatographs	Hewlett-Packard	5890	FID	8015 Mod/OA2	Mar-91
Gas Chromatographs	Hewlett-Packard	5890	FID	8016 Mod/OA2	Mar-91
HPLC	Waters	Waters 600E	UV/Fluoresence	610/8310	1998
HPLC	Hewlett-Packard	1050	UV/Fluoresence	610/8310	2000
ICP	Perkin-Elmer	OPTIMA 4300 DV			2000
ICP	TJA 61E SEQ	13193300			1991
Graphite Furnace(GFAA)	Perkin-Elmer	5100 ZEE			1991
Mercury Analyzer	Perkin Elmer	FIMS 400		N/A	1995
Auto Analyzer	Lachat QuikChem	8000 FIA+	2000-0042	N/A	2000
TOC	Astrowater	2001	UV		1993
Ion Chromatograph	Dionex	DX-100	Conductivity detector		1992
Ion Chromatograph	Dionex	DX-100	Conductivity detector		1992



CERTIFICATION SUMMARY

Laboratory: Lenexa, Kansas

Accrediting Authority	Accrediting Agency	Program Category	Certification #	Status	Expiration Date	Contact
Kansas	KDHE	DW, WW, HW	E-10116	Current	4/30/03	Aurora Shields
Arkansas	DEQ	WW, S/HW	02-05532	Current	1/10/03	Jeff Ruehr
Oklahoma	DEQ	WW, S/HW	9205	Current	8/31/02	Tony Bright
Iowa	IDNR	DW, WW, HW UST	118	Current	07/01/02	Stacy Freiburg
Missouri	NA	Reciprocal of Kansas				
Louisiana	DEQ	WW, S/HW	AI# 55333	Current	6/30/02	Louis R.C Johnson

DW = Drinking water
S/HW = Solid and Hazardous waste

WW = Waste water
Air = Air

KANSAS DEPARTMENT OF HEALTH & ENVIRONMENT
Environmental Laboratory Certification
DRINKING WATER CERTIFICATION
PARAMETER LIST

1

This certificate supersedes parameter list dated:02/28/2002

FACE ANALYTICAL SERVICES INC
9608 LOIRET BOULEVARD
LENEXA, KS 66219-2406

CERTIFICATE NUMBER:E-10116
EFFECTIVE DATE: 05/01/2002
EXPIRATION DATE:04/30/2003

The laboratory listed above is hereby approved for environmental laboratory certification in accordance with K.S.A. 65-1,109a for performing drinking water analysis for the following parameters:

****METALS**

(A) Aluminum----- (EPA 200.7)
(A) Antimony----- (SM 3113 B)
(A) Arsenic----- (EPA 200.7)
(A) Barium----- (EPA 200.7)
(A) Beryllium----- (EPA 200.7)
(A) Cadmium----- (EPA 200.7)
(A) Calcium----- (EPA 200.7)
(A) Chromium----- (EPA 200.7)
(A) Copper----- (EPA 200.7)
(A) Iron----- (EPA 200.7)
(A) Lead----- (EPA 200.9)
(A) Lead----- (SM 3113 B)
(A) Manganese----- (EPA 200.7)
(A) Mercury----- (EPA 245.2)
(A) Nickel----- (EPA 200.7)
(I) Selenium----- (EPA 200.9)
(A) Selenium----- (SM 3113 B)
(A) Silica----- (EPA 200.7)
(A) Silica----- (SM 4500-Si D)
(A) Silver----- (EPA 200.7)
(A) Sodium----- (EPA 200.7)
(A) Zinc----- (EPA 200.7)

****MINERALS**

(A) Chloride----- (EPA 300.0)
(A) Hardness----- (EPA 200.7)

****MISCELLANEOUS**

(A) Bromide----- (EPA 300.0)
(A) Hydrogen Ion (pH)----- (EPA 150.1)
(A) Surfactants (MBAS)----- (SM 5540 C)
(A) Temperature----- (SM 2550 B)
(A) Total Organic Halides----- (SM 5320 B)
(A) Turbidity----- (EPA 180.1)

****NUTRIENTS**

(A) Nitrate----- (EPA 300.0)
(A) Nitrate----- (EPA 253.2)
(A) Nitrite----- (EPA 300.0)

A-Approved P-Provisional I-Interim C-Conditional

3

KANSAS DEPARTMENT OF HEALTH & ENVIRONMENT
Environmental Laboratory Certification
DRINKING WATER CERTIFICATION
PARAMETER LIST

This certificate supersedes parameter list dated:02/28/2002

PACE ANALYTICAL SERVICES INC
9608 LOIRET BOULEVARD
LENEXA, KS 66219-2406

CERTIFICATE NUMBER: E-10116
EFFECTIVE DATE: 05/01/2002
EXPIRATION DATE: 04/30/2003

(A) Bromochloromethane-----	(EPA 524.2)
(A) Chloroethane-----	(EPA 524.2)
(A) Chloromethane-----	(EPA 524.2)
(A) Dibromomethane-----	(EPA 524.2)
(A) Dichlorodifluoromethane-----	(EPA 524.2)
(A) Hexachlorobutadiene-----	(EPA 524.2)
(A) Isopropylbenzene-----	(EPA 524.2)
(A) Methyl-t-butyl ether-----	(EPA 524.2)
(A) Naphthalene-----	(EPA 524.2)
(A) Nitrobenzene-----	(EPA 524.2)
(A) Trichlorofluoromethane-----	(EPA 524.2)
(A) 1,1-Dichloroethane-----	(EPA 524.2)
(A) 1,1-Dichloropropene-----	(EPA 524.2)
(A) 1,1,1,2-Tetrachloroethane-----	(EPA 524.2)
(A) 1,1,2,2-Tetrachloroethane-----	(EPA 524.2)
(A) 1,2,3-Trichlorobenzene-----	(EPA 524.2)
(A) 1,2,3-Trichloropropane-----	(EPA 524.2)
(A) 1,2,4-Trimethylbenzene-----	(EPA 524.2)
(A) 1,3-Dichlorobenzene-----	(EPA 524.2)
(A) 1,3-Dichloropropane-----	(EPA 524.2)
(A) 1,3,5-Trimethylbenzene-----	(EPA 524.2)
(A) 2-Chlorotoluene-----	(EPA 524.2)
(A) 2,2-Dichloropropane-----	(EPA 524.2)
(A) 4-Chlorotoluene-----	(EPA 524.2)
(A) 4-Isopropyltoluene-----	(EPA 524.2)

A-Approved P-Provisional I-Interim C-Conditional

KANSAS DEPARTMENT OF HEALTH & ENVIRONMENT
Environmental Laboratory Certification
WASTEWATER CERTIFICATION
PARAMETER LIST

2

This certificate supersedes all previous certificates

PACE ANALYTICAL SERVICES INC
9608 LOIRET BOULEVARD
LENEXA, KS 66219-2406

CERTIFICATE NUMBER: E-10116
EFFECTIVE DATE: 05/01/2002
EXPIRATION DATE: 04/30/2003

(A) Iron-----	(EPA 200.7)
(A) Lead-----	(EPA 200.7)
(A) Lead-----	(EPA 239.2)
(A) Magnesium-----	(EPA 200.7)
(A) Manganese-----	(EPA 200.7)
(A) Mercury-----	(EPA 245.1)
(A) Molybdenum-----	(EPA 200.7)
(A) Nickel-----	(EPA 200.7)
(A) Potassium-----	(EPA 200.7)
(A) Selenium-----	(EPA 200.7)
(A) Selenium-----	(EPA 270.2)
(A) Silica-----	(EPA 370.1)
(A) Silica-----	(SM 4500-Si D)
(A) Silver-----	(EPA 200.7)
(A) Sodium-----	(EPA 200.7)
(A) Thallium-----	(EPA 200.7)
(A) Thallium-----	(EPA 279.1)
(A) Tin-----	(EPA 200.7)
(A) Titanium-----	(EPA 200.7-ATP)
(A) Vanadium-----	(EPA 200.7)
(A) Zinc-----	(EPA 200.7)

**METALS - 503 Regs

(A) Arsenic-----	(EPA 6010B)
(A) Cadmium-----	(EPA 6010B)
(A) Chromium, Total-----	(EPA 6010B)
(A) Copper-----	(EPA 6010B)
(A) Lead-----	(EPA 6010B)
(A) Mercury-----	(EPA 7470)
(A) Mercury-----	(EPA 7471)
(A) Molybdenum-----	(EPA 6010B)
(A) Nickel-----	(EPA 6010B)

**MICROBIOLOGY

(A) Fecal Coliforms-----	(SM 9222 D)
(A) Fecal Coliforms in Wastewater Sludges-----	(SM 9222 D)
(A) Total Coliforms-----	(SM 9222 B)

**MINERALS

(A) Acidity-----	(EPA 305.1)
(A) Acidity-----	(SM 2310 B)
(A) Alkalinity-----	(EPA 310.2)
(A) Alkalinity-----	(SM 2320 B)
(A) Chloride-----	(EPA 300.0)

A-Approved P-Provisional I-Interim C-Conditional

KANSAS DEPARTMENT OF HEALTH & ENVIRONMENT
Environmental Laboratory Certification
WASTEWATER CERTIFICATION
PARAMETER LIST

4

This certificate supersedes all previous certificates

PACE ANALYTICAL SERVICES INC
9608 LOIRET BOULEVARD
LENEXA, KS 66219-2406

CERTIFICATE NUMBER: E-10116
EFFECTIVE DATE: 05/01/2002
EXPIRATION DATE: 04/30/2003

**ORGANIC CHEMISTRY (MEASUREMENT BY GC/MS)

(A) BASE/NEUTRALS & ACIDS----- (EPA 625)

**ORGANIC CHEMISTRY VOLATILES (MEASUREMENT BY GC)

(A) PURGEABLE AROMATICS----- (EPA 602)

**ORGANIC CHEMISTRY VOLATILES (MEASUREMENT BY GC/MS)

(A) PURGEABLE ORGANICS----- (EPA 624)

A-Approved P-Provisional I-Interim C-Conditional

Pace Analytical Services, Inc.
Lenexa, KS

E-10116
Effective Date: 05/01/2002
Expiration Date: 04/30/2003

Clean Water Act - Organic Analytes Attachment

PHENANTHRENE	EPA 625
PHENOL	EPA 625
PYRENE	EPA 625

BENZENE	EPA 602
ETHYLBENZENE	EPA 602
TOLUENE	EPA 602

ACROLEIN	EPA 624
ACRYLONITRILE	EPA 624
BENZENE	EPA 624
BROMODICHLOROMETHANE	EPA 624
BROMOFORM	EPA 624
BROMOMETHANE	EPA 624
CARBON TETRACHLORIDE	EPA 624
CHLOROBENZENE	EPA 624
CHLOROETHANE	EPA 624
2-CHLOROETHYL VINYL ETHER	EPA 624
CHLOROFORM	EPA 624
CHLOROMETHANE	EPA 624
DIBROMOCHLOROMETHANE	EPA 624
1,2-DICHLOROBENZENE	EPA 624
1,3-DICHLOROBENZENE	EPA 624
1,4-DICHLOROBENZENE	EPA 624
1,1-DICHLOROETHANE	EPA 624
1,2-DICHLOROETHANE	EPA 624
1,1-DICHLOROETHENE	EPA 624
trans-1,2-DICHLOROETHENE	EPA 624
1,2-DICHLOROPROPANE	EPA 624
cis-1,3-DICHLOROPROPENE	EPA 624
trans-1,3-DICHLOROPROPENE	EPA 624
ETHYLBENZENE	EPA 624
METHYLENE CHLORIDE	EPA 624
1,1,2,2-TETRACHLOROETHANE	EPA 624
TETRACHLOROETHENE	EPA 624
TOLUENE	EPA 624
1,1,1-TRICHLOROETHANE	EPA 624
1,1,2-TRICHLOROETHANE	EPA 624
TRICHLOROETHENE	EPA 624
TRICHLOROFLUOROMETHANE	EPA 624
VINYL CHLORIDE	EPA 624

KANSAS DEPARTMENT OF HEALTH & ENVIRONMENT
Environmental Laboratory Certification
SOLID/HAZARDOUS WASTE CERTIFICATION
PARAMETER LIST

2

This certificate supersedes all previous certificates

FACE ANALYTICAL SERVICES INC
9608 LOIRET BOULEVARD
LENEKA, KS 66219-2406

CERTIFICATE NUMBER: E-10116
EFFECTIVE DATE: 05/01/2002
EXPIRATION DATE: 04/30/2003

(A) Molybdenum----- (EPA 6010B)
(A) Nickel----- (EPA 6010B)
(A) Potassium----- (EPA 6010B)
(A) Selenium----- (EPA 6010B)
(A) Selenium----- (EPA 7740)
(A) Silica----- (EPA 6010B)
(A) Silver----- (EPA 6010B)
(A) Sodium----- (EPA 6010B)
(A) Strontium----- (EPA 6010B)
(A) Thallium----- (EPA 6010B)
(A) Thallium----- (EPA 7841)
(A) Tin----- (EPA 6010B)
(A) Titanium----- (EPA 6010B)
(A) Vanadium----- (EPA 6010B)
(A) Zinc----- (EPA 6010B)

**MINERALS

(A) Bromide----- (EPA 9056)
(A) Chloride----- (EPA 9056)
(A) Chloride----- (EPA 9251)
(A) Fluoride----- (EPA 9056)
(A) Sulfate----- (EPA 9056)
(A) Sulfide----- (EPA 9034)

**MISCELLANEOUS

(A) Cation-Exchange Capacity of Soils----- (EPA 9081)
(A) Hydrogen Ion (pH)----- (EPA 9040B)
(A) Hydrogen Ion (pH)----- (EPA 9045C)
(A) Oil & Grease----- (EPA 9070A)
(A) Oil & Grease----- (EPA 9071B)
(A) Paint Filter Liquids Test----- (EPA 9095A)
(A) Phenolics----- (EPA 9065)
(A) Phenolics----- (EPA 9066)
(A) Specific Conductance----- (EPA 9050A)

**NUTRIENTS

(A) Nitrate----- (EPA 9056)
(A) Nitrite----- (EPA 9056)

**ORGANIC CHEMISTRY (MEASUREMENT BY GC)

(A) EDB AND EBCP----- (EPA 8011)
(A) ORGANOCHLORINE PESTICIDES----- (EPA 8081A)
(A) POLYCHLORINATED BIPHENYLS----- (EPA 8082)

A-Approved P-Provisional I-Interim C-Conditional

Pace analytical Services, Inc.
Lenexa, KS

E-10116
Effective Date: 05/01/2002
Expiration Date: 04/30/2003

Solids & Hazardous Waste - Organic Analytes Attachment

1,2-DIBROMOETHANE	EPA 8013	PARATHION METHYL	EPA 8141A
DIBROMOCHLOROPROPANE	EPA 8013	PHORATE	EPA 8141A
		RONNEL	EPA 8141A
4,4'-DDD	EPA 8081A	SIMAZINE	EPA 8141A
4,4'-DDE	EPA 8081A	STIROPHOS	EPA 8141A
4,4'-DDT	EPA 8081A	SULFOTEPP	EPA 8141A
a-BHC	EPA 8081A	TEPP	EPA 8141A
a-CHLORDANE	EPA 8081A	TERBUFOS	EPA 8141A
ALDRIN	EPA 8081A	THIONAZIN	EPA 8141A
b-BHC	EPA 8081A	TOKUTHION	EPA 8141A
CHLORDANE (tech.)	EPA 8081A	TRICHLORONATE	EPA 8141A
d-BHC	EPA 8081A		
DIELDRIN	EPA 8081A	2,4,5-T	EPA 8151A
ENDOSULFAN I	EPA 8081A	2,4,5-TP (SILVEX)	EPA 8151A
ENDOSULFAN II	EPA 8081A	2,4-D	EPA 8151A
ENDOSULFAN SULFATE	EPA 8081A	2,4-DB	EPA 8151A
ENDRIN	EPA 8081A	DALAPON	EPA 8151A
ENDRIN ALDEHYDE	EPA 8081A	DICAMBA	EPA 8151A
ENDRIN KETONE	EPA 8081A	DICHLORPROP	EPA 8151A
g-BHC (LINDANE)	EPA 8081A	DINOSEB	EPA 8151A
g-CHLORDANE	EPA 8081A	MCPA	EPA 8151A
HEPTACHLOR	EPA 8081A	MCPD	EPA 8151A
HEPTACHLOR EPOXIDE	EPA 8081A		
METHOXYCHLOR	EPA 8081A	1,2,4-TRICHLOROBENZENE	EPA 8270C
TOXAPHENE	EPA 8081A	1,2-DICHLOROBENZENE	EPA 8270C
		1,2-DIPHENYLHYDRAZINE	EPA 8270C
PCB-1016	EPA 8082	1,3-DICHLOROBENZENE	EPA 8270C
PCB-1221	EPA 8082	1,4-DICHLOROBENZENE	EPA 8270C
PCB-1232	EPA 8082	1-CHLORONAPHTHALENE	EPA 8270C
PCB-1242	EPA 8082	2,4,5-TRICHLOROPHENOL	EPA 8270C
PCB-1248	EPA 8082	2,4,6-TRICHLOROPHENOL	EPA 8270C
PCB-1254	EPA 8082	2,4-DICHLOROPHENOL	EPA 8270C
PCB-1260	EPA 8082	2,4-DIMETHYLPHENOL	EPA 8270C
		2,4-DINITROPHENOL	EPA 8270C
ATRAZINE	EPA 8141A	2,4-DINITROTOLUENE	EPA 8270C
AZINPHOS METHYL	EPA 8141A	2,6-DICHLOROPHENOL	EPA 8270C
BOLSTAR	EPA 8141A	2,6-DINITROTOLUENE	EPA 8270C
CHLORFENVINPHOS	EPA 8141A	2-CHLORONAPHTHALENE	EPA 8270C
CHLORPYRIFOS	EPA 8141A	2-CHLOROPHENOL	EPA 8270C
COUMAPHOS	EPA 8141A	2-METHYL-4,6-DINITROPHENOL	EPA 8270C
DEMETON-O	EPA 8141A	2-METHYLNAPHTHALENE	EPA 8270C
DEMETON-S	EPA 8141A	2-METHYLPHENOL	EPA 8270C
DIAZINON	EPA 8141A	2-NITROANILINE	EPA 8270C
DICHLORVOS	EPA 8141A	2-NITROPHENOL	EPA 8270C
DIMETHOATE	EPA 8141A	3,3'-DICHLOROBENZIDINE	EPA 8270C
EPN	EPA 8141A	3-METHYLPHENOL	EPA 8270C
ETHION	EPA 8141A	3-NITROANILINE	EPA 8270C
ETHOPROP	EPA 8141A	4-BROMOPHENYL PHENYL ETHER	EPA 8270C
FAMPHUR	EPA 8141A	4-CHLORO-3-METHYLPHENOL	EPA 8270C
FENSULFOTHION	EPA 8141A	4-CHLOROANILINE	EPA 8270C
FENTHION	EPA 8141A	4-CHLOROPHENYL PHENYL ETHER	EPA 8270C
MALATHION	EPA 8141A	4-METHYLPHENOL	EPA 8270C
MERPHOS	EPA 8141A	4-NITROANILINE	EPA 8270C
MEVINPHOS	EPA 8141A	4-NITROPHENOL	EPA 8270C
NALED	EPA 8141A	7,12-DIMETHYLBENZ(a)ANTHRACENE	EPA 8270C
PARATHION (ETHYL)	EPA 8141A	ACENAPHTHENE	EPA 8270C

KANSAS DEPARTMENT OF HEALTH & ENVIRONMENT
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

Pace analytical Services, Inc.
Lenexa, KS

E-10116
Effective Date: 05/01/2002
Expiration Date: 04/30/2003

Solids & Hazardous Waste - Organic Analytes Attachment

CARBON DISULFIDE	EPA 8260B
CARBON TETRACHLORIDE	EPA 8260B
CHLOROBENZENE	EPA 8260B
CHLOROETHANE	EPA 8260B
CHLOROFORM	EPA 8260B
CHLOROMETHANE	EPA 8260B
cis-1,2-DICHLOROETHENE	EPA 8260B
cis-1,3-DICHLOROPROPENE	EPA 8260B
cis-1,4-DICHLORO-2-BUTENE	EPA 8260B
DIBROMOCHLOROMETHANE	EPA 8260B
DIBROMOCHLOROPROPANE	EPA 8260B
DIBROMOMETHANE	EPA 8260B
DICHLORODIFLUOROMETHANE	EPA 8260B
ETHYLBENZENE	EPA 8260B
HEXACHLOROBUTADIENE	EPA 8260B
HEXACHLOROETHANE	EPA 8260B
IODOMETHANE	EPA 8260B
ISOPROPYLBENZENE	EPA 8260B
METHYL ETHYL KETONE (MEK)	EPA 8260B
METHYL METHACRYLATE	EPA 8260B
METHYLENE CHLORIDE	EPA 8260B
METHYL-T-BUTYL ETHER	EPA 8260B
m-Xylene	EPA 8260B
NAPHTHALENE	EPA 8260B
n-BUTYLBENZENE	EPA 8260B
n-PROPYLBENZENE	EPA 8260B
o-Xylene	EPA 8260B
p-ISOPROPYLTOLUENE	EPA 8260B
p-Xylene	EPA 8260B
sec-BUTYLBENZENE	EPA 8260B
STYRENE	EPA 8260B
tert-BUTYLBENZENE	EPA 8260B
TETRACHLOROETHENE	EPA 8260B
TOLUENE	EPA 8260B
trans-1,2-DICHLOROETHENE	EPA 8260B
trans-1,3-DICHLOROPROPENE	EPA 8260B
trans-1,4-DICHLORO-2-BUTENE	EPA 8260B
TRICHLOROETHENE	EPA 8260B
TRICHLOROFLUOROMETHANE	EPA 8260B
VINYL ACETATE	EPA 8260B
VINYL CHLORIDE	EPA 8260B

Pace Analytical Services, Inc.
Kansas laboratory

PE Sample Investigation Report for Unacceptable Results
Study ID:

Parameter:

Analysis Preparation

Were correct volumes used?
Were any problems noted during extract blow-down? (organics)
Was the final volume accurately measured and recorded?
Were the directions for preparation of ampulated samples followed correctly?
Were any special instructions for preparation included with the samples? (i.e. use entire volume)
Were duplicate/spikes performed on the QC sample?
Any additional comments?

Calibration and Analysis

What was the RSD/corr. coef. for this analyte in initial calibration?
What was the %D for this analyte in continuing calibration?
Is there any associated MS data for this analyte?
If so, what were the percent recovery/RPD values?
What was the result (% rec) of the LCS or any other reference standard for this analyte?
Were any dilutions necessary?
If so, were dilutions accurately used in the calculation of the result?
Were any blank contamination problems found which could affect this result?
Any additional comments?

Corrective Actions

Result of follow-up performance sample (re-analyze the same PE if practical)

Concentration:
Result:
% Recovery:

QAO Comments:

Attachment F

Methods and Minimum Reporting Limits

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 200.7 Trace	Water	Barium	4	ug/L
EPA 200.7 Trace	Water	Beryllium	1	ug/L
EPA 200.7 Trace	Water	Calcium	100	ug/L
EPA 200.7 Trace	Water	Cadmium	5	ug/L
EPA 200.7 Trace	Water	Cobalt	7	ug/L
EPA 200.7 Trace	Water	Chromium	7	ug/L
EPA 200.7 Trace	Water	Copper	10	ug/L
EPA 200.7 Trace	Water	Iron	40	ug/L
EPA 200.7 Trace	Water	Potassium	1000	ug/L
EPA 200.7 Trace	Water	Lithium	50	ug/L
EPA 200.7 Trace	Water	Magnesium	50	ug/L
EPA 200.7 Trace	Water	Manganese	7	ug/L
EPA 200.7 Trace	Water	Molybdenum	20	ug/L
EPA 200.7 Trace	Water	Sodium	150	ug/L
EPA 200.7 Trace	Water	Nickel	30	ug/L
EPA 200.7 Trace	Water	Phosphorus	100	ug/L
EPA 200.7 Trace	Water	Lead	5	ug/L
EPA 200.7 Trace	Water	Antimony	10	ug/L
EPA 200.7 Trace	Water	Selenium	5	ug/L
EPA 200.7 Trace	Water	Silicon	500	ug/L
EPA 200.7 Trace	Water	Tin	250	ug/L
EPA 200.7 Trace	Water	Strontium	15	ug/L
EPA 200.7 Trace	Water	Titanium	10	ug/L
EPA 200.7 Trace	Water	Thallium	5	ug/L
EPA 200.7 Trace	Water	Vanadium	12	ug/L
EPA 200.7 Trace	Water	Zinc	20	ug/L
EPA 204.2	Water	Antimony	10	ug/L
EPA 206.2	Water	Arsenic	5	ug/L
EPA 239.2	Water	Lead	5	ug/L
EPA 245.1	Water	Mercury	0.2	ug/L
EPA 245.2	Solid	Mercury	0.154	mg/kg
EPA 270.2	Water	Selenium	5	ug/L
EPA 279.1	Water	Thallium	5	ug/L
EPA 300.0	Solid	Chloride	5	mg/kg
EPA 300.0	Solid	Fluoride	5	mg/kg
EPA 300.0	Solid	Sulfate	5	mg/kg
EPA 300.0	Solid	Bromide	5	mg/kg
EPA 300.0	Solid	Iodide	5	mg/kg
EPA 300.0	Solid	Nitrite as N	5	mg/kg
EPA 300.0	Solid	Nitrate as N	1	mg/kg
EPA 300.0	Solid	Orthophosphate as P	5	mg/kg
EPA 300.0	Water	Chloride	1	mg/L
EPA 300.0	Water	Fluoride	0.2	mg/L
EPA 300.0	Water	Sulfate	1	mg/L
EPA 300.0	Water	Bromide	1	mg/L
EPA 300.0	Water	Iodide	1	mg/L
EPA 300.0	Water	Nitrite as N	1	mg/L
EPA 300.0	Water	Nitrate as N	1	mg/L
EPA 300.0	Water	Orthophosphate as P	1	mg/L
EPA 305.1	Solid	Acidity, Total	10	mg/kg
EPA 305.1	Water	Acidity, Total	1	mg/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 524.2	Water	1,2,3-Trichlorobenzene	1	ug/L
EPA 524.2	Water	1,2,3-Trichloropropane	1	ug/L
EPA 524.2	Water	1,3-Dichlorobenzene	0.5	ug/L
EPA 524.2	Water	1,3-Dichloropropane	0.5	ug/L
EPA 524.2	Water	1,3,5-Trimethylbenzene	0.5	ug/L
EPA 524.2	Water	1,4-Dichlorobenzene	0.5	ug/L
EPA 524.2	Water	1,2-Dichlorobenzene-d4 (S)		ug/L
EPA 524.2	Water	2,2-Dichloropropane	0.5	ug/L
EPA 524.2	Water	2-Chlorotoluene	0.5	ug/L
EPA 524.2	Water	4-Chlorotoluene	0.5	ug/L
EPA 524.2	Water	4-Bromofluorobenzene (S)		ug/L
EPA 524.2	Water	Bromochloromethane	0.5	ug/L
EPA 524.2	Water	Benzene	0.5	ug/L
EPA 524.2	Water	Bromobenzene	0.5	ug/L
EPA 524.2	Water	Bromodichloromethane	0.5	ug/L
EPA 524.2	Water	Bromomethane	0.5	ug/L
EPA 524.2	Water	Bromoform	0.5	ug/L
EPA 524.2	Water	cis-1,2-Dichloroethene	0.5	ug/L
EPA 524.2	Water	cis-1,3-Dichloropropene	0.5	ug/L
EPA 524.2	Water	Carbon tetrachloride	0.5	ug/L
EPA 524.2	Water	Chlorobenzene	0.5	ug/L
EPA 524.2	Water	Chloroethane	0.5	ug/L
EPA 524.2	Water	Chloroform	0.5	ug/L
EPA 524.2	Water	Chloromethane	0.5	ug/L
EPA 524.2	Water	Dibromochloromethane	0.5	ug/L
EPA 524.2	Water	Dichlorodifluoromethane	0.5	ug/L
EPA 524.2	Water	Dibromomethane	0.5	ug/L
EPA 524.2	Water	Ethylbenzene	0.5	ug/L
EPA 524.2	Water	Hexachloro-1,3-butadiene	0.5	ug/L
EPA 524.2	Water	Isopropylbenzene (Cumene)	0.5	ug/L
EPA 524.2	Water	Methylene chloride	1	ug/L
EPA 524.2	Water	Methyl-tert-butyl ether	1	ug/L
EPA 524.2	Water	m&p-Xylene	1	ug/L
EPA 524.2	Water	Naphthalene	1	ug/L
EPA 524.2	Water	n-Butylbenzene	0.5	ug/L
EPA 524.2	Water	n-Propylbenzene	0.5	ug/L
EPA 524.2	Water	o-Xylene	0.5	ug/L
EPA 524.2	Water	p-Isopropyltoluene	0.5	ug/L
EPA 524.2	Water	sec-Butylbenzene	0.5	ug/L
EPA 524.2	Water	Styrene	0.5	ug/L
EPA 524.2	Water	trans-1,2-Dichloroethene	0.5	ug/L
EPA 524.2	Water	trans-1,3-Dichloropropene	0.5	ug/L
EPA 524.2	Water	Tetrachloroethene	0.5	ug/L
EPA 524.2	Water	Toluene	0.5	ug/L
EPA 524.2	Water	Trichloroethene	0.5	ug/L
EPA 524.2	Water	Trichlorofluoromethane	0.5	ug/L
EPA 524.2	Water	tert-Butylbenzene	0.5	ug/L
EPA 524.2	Water	Vinyl chloride	0.5	ug/L
SM 5520 B	Solid	Oil and Grease	50	mg/kg
SM 5520 B	Water	Oil and Grease	5	mg/L
SM 5520 B	Solid	Total Petroleum Hydrocarbons	50	mg/kg

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 6010B	Water	Gold	100	ug/L
EPA 6010B	Water	Boron	30	ug/L
EPA 6010B	Water	Barium	4	ug/L
EPA 6010B	Water	Beryllium	1	ug/L
EPA 6010B	Water	Calcium	100	ug/L
EPA 6010B	Water	Cadmium	5	ug/L
EPA 6010B	Water	Cobalt	7	ug/L
EPA 6010B	Water	Chromium	7	ug/L
EPA 6010B	Water	Copper	10	ug/L
EPA 6010B	Water	Iron	40	ug/L
EPA 6010B	Water	Potassium	1000	ug/L
EPA 6010B	Water	Lithium	50	ug/L
EPA 6010B	Water	Magnesium	50	ug/L
EPA 6010B	Water	Manganese	7	ug/L
EPA 6010B	Water	Molybdenum	20	ug/L
EPA 6010B	Water	Sodium	150	ug/L
EPA 6010B	Water	Nickel	30	ug/L
EPA 6010B	Water	Phosphorus	100	ug/L
EPA 6010B	Water	Lead	50	ug/L
EPA 6010B	Water	Antimony	50	ug/L
EPA 6010B	Water	Selenium	100	ug/L
EPA 6010B	Water	Silicon	500	ug/L
EPA 6010B	Water	Tin	250	ug/L
EPA 6010B	Water	Strontium	15	ug/L
EPA 6010B	Water	Titanium	10	ug/L
EPA 6010B	Water	Thallium	100	ug/L
EPA 6010B	Water	Vanadium	12	ug/L
EPA 6010B	Water	Zinc	100	ug/L
EPA 6010B TCLP	Leachate	Silver	70	ug/L
EPA 6010B TCLP	Leachate	Aluminum	750	ug/L
EPA 6010B TCLP	Leachate	Arsenic	850	ug/L
EPA 6010B TCLP	Leachate	Gold	1000	ug/L
EPA 6010B TCLP	Leachate	Boron	300	ug/L
EPA 6010B TCLP	Leachate	Barium	40	ug/L
EPA 6010B TCLP	Leachate	Beryllium	10	ug/L
EPA 6010B TCLP	Leachate	Calcium	1000	ug/L
EPA 6010B TCLP	Leachate	Cadmium	50	ug/L
EPA 6010B TCLP	Leachate	Cobalt	70	ug/L
EPA 6010B TCLP	Leachate	Chromium	70	ug/L
EPA 6010B TCLP	Leachate	Copper	100	ug/L
EPA 6010B TCLP	Leachate	Iron	400	ug/L
EPA 6010B TCLP	Leachate	Potassium	10000	ug/L
EPA 6010B TCLP	Leachate	Lithium	500	ug/L
EPA 6010B TCLP	Leachate	Magnesium	500	ug/L
EPA 6010B TCLP	Leachate	Manganese	70	ug/L
EPA 6010B TCLP	Leachate	Molybdenum	200	ug/L
EPA 6010B TCLP	Leachate	Sodium	1500	ug/L
EPA 6010B TCLP	Leachate	Nickel	300	ug/L
EPA 6010B TCLP	Leachate	Phosphorus	1000	ug/L
EPA 6010B TCLP	Leachate	Lead	500	ug/L
EPA 6010B TCLP	Leachate	Antimony	500	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 6010B Trace	Solid	Iron	10	mg/kg
EPA 6010B Trace	Solid	Potassium	100	mg/kg
EPA 6010B Trace	Solid	Lithium	5	mg/kg
EPA 6010B Trace	Solid	Magnesium	5	mg/kg
EPA 6010B Trace	Solid	Manganese	0.7	mg/kg
EPA 6010B Trace	Solid	Molybdenum	2	mg/kg
EPA 6010B Trace	Solid	Sodium	15	mg/kg
EPA 6010B Trace	Solid	Nickel	3	mg/kg
EPA 6010B Trace	Solid	Phosphorus	10	mg/kg
EPA 6010B Trace	Solid	Lead	0.5	mg/kg
EPA 6010B Trace	Solid	Antimony	1	mg/kg
EPA 6010B Trace	Solid	Selenium	1	mg/kg
EPA 6010B Trace	Solid	Silicon	50	mg/kg
EPA 6010B Trace	Solid	Tin	25	mg/kg
EPA 6010B Trace	Solid	Strontium	1.5	mg/kg
EPA 6010B Trace	Solid	Tellurium	1000	mg/kg
EPA 6010B Trace	Solid	Titanium	1	mg/kg
EPA 6010B Trace	Solid	Thallium	1.6	mg/kg
EPA 6010B Trace	Solid	Vanadium	1.2	mg/kg
EPA 6010B Trace	Solid	Zinc	5	mg/kg
EPA 6010B Trace	Water	Silver	7	ug/L
EPA 6010B Trace	Water	Aluminum	75	ug/L
EPA 6010B Trace	Water	Arsenic	5	ug/L
EPA 6010B Trace	Water	Gold	100	ug/L
EPA 6010B Trace	Water	Boron	30	ug/L
EPA 6010B Trace	Water	Barium	4	ug/L
EPA 6010B Trace	Water	Beryllium	1	ug/L
EPA 6010B Trace	Water	Calcium	100	ug/L
EPA 6010B Trace	Water	Cadmium	5	ug/L
EPA 6010B Trace	Water	Cobalt	7	ug/L
EPA 6010B Trace	Water	Chromium	7	ug/L
EPA 6010B Trace	Water	Copper	10	ug/L
EPA 6010B Trace	Water	Iron	40	ug/L
EPA 6010B Trace	Water	Potassium	1000	ug/L
EPA 6010B Trace	Water	Lithium	50	ug/L
EPA 6010B Trace	Water	Magnesium	50	ug/L
EPA 6010B Trace	Water	Manganese	7	ug/L
EPA 6010B Trace	Water	Molybdenum	20	ug/L
EPA 6010B Trace	Water	Sodium	150	ug/L
EPA 6010B Trace	Water	Nickel	30	ug/L
EPA 6010B Trace	Water	Phosphorus	100	ug/L
EPA 6010B Trace	Water	Lead	5	ug/L
EPA 6010B Trace	Water	Antimony	10	ug/L
EPA 6010B Trace	Water	Selenium	10	ug/L
EPA 6010B Trace	Water	Silicon	500	ug/L
EPA 6010B Trace	Water	Tin	250	ug/L
EPA 6010B Trace	Water	Strontium	15	ug/L
EPA 6010B Trace	Water	Titanium	10	ug/L
EPA 6010B Trace	Water	Thallium	5	ug/L
EPA 6010B Trace	Water	Vanadium	12	ug/L
EPA 6010B Trace	Water	Zinc	100	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 619	Water	Prometon	0.4	ug/L
EPA 619	Water	Simazine	0.4	ug/L
EPA 624	Water	1,1-Dichloroethane	5	ug/L
EPA 624	Water	1,1-Dichloroethene	5	ug/L
EPA 624	Water	1,1,1-Trichloroethane	5	ug/L
EPA 624	Water	1,1,2-Trichloroethane	5	ug/L
EPA 624	Water	1,1,2,2-Tetrachloroethane	6.9	ug/L
EPA 624	Water	1,2-Dichlorobenzene	5	ug/L
EPA 624	Water	1,2-Dichloroethane	5	ug/L
EPA 624	Water	1,2-Dichloropropane	6	ug/L
EPA 624	Water	1,2-Dichloroethene (Total)	10	ug/L
EPA 624	Water	1,3-Dichloropropene	5	ug/L
EPA 624	Water	1,3-Dichlorobenzene	5	ug/L
EPA 624	Water	1,4-Dichlorobenzene	5	ug/L
EPA 624	Water	2-Chloroethylvinyl ether	5	ug/L
EPA 624	Water	2-Propanol	500	ug/L
EPA 624	Water	Acetone	100	ug/L
EPA 624	Water	Acrolein	100	ug/L
EPA 624	Water	Acrylonitrile	100	ug/L
EPA 624	Water	Benzene	5	ug/L
EPA 624	Water	Bromodichloromethane	5	ug/L
EPA 624	Water	Bromomethane	5	ug/L
EPA 624	Water	Bromoform	5	ug/L
EPA 624	Water	cis-1,2-Dichloroethene	5	ug/L
EPA 624	Water	cis-1,3-Dichloropropene	5	ug/L
EPA 624	Water	Carbon tetrachloride	5	ug/L
EPA 624	Water	Chlorobenzene	6	ug/L
EPA 624	Water	Chloroethane	5	ug/L
EPA 624	Water	Chloroform	5	ug/L
EPA 624	Water	Chloromethane	5	ug/L
EPA 624	Water	Dibromochloromethane	5	ug/L
EPA 624	Water	Dichlorodifluoromethane	5	ug/L
EPA 624	Water	Ethylbenzene	7.2	ug/L
EPA 624	Water	Ethyl amyl ketone	100	ug/L
EPA 624	Water	Methylene chloride	5	ug/L
EPA 624	Water	4-Methyl-2-pentanone (MIBK)	100	ug/L
EPA 624	Water	n-Hexane	10	ug/L
EPA 624	Water	Styrene	5	ug/L
EPA 624	Water	trans-1,2-Dichloroethene	5	ug/L
EPA 624	Water	trans-1,3-Dichloropropene	5	ug/L
EPA 624	Water	Tetrachloroethene	5	ug/L
EPA 624	Water	1,1,2-Trichlorotrifluoroethane	5	ug/L
EPA 624	Water	Toluene	6	ug/L
EPA 624	Water	Trichloroethene	5	ug/L
EPA 624	Water	Trichlorofluoromethane	5	ug/L
EPA 624	Water	Xylene (Total)	5	ug/L
EPA 624	Water	Vinyl chloride	5	ug/L
EPA 624 Low Level	Water	1,1-Dichloroethane	0.5	ug/L
EPA 624 Low Level	Water	1,1-Dichloroethene	1	ug/L
EPA 624 Low Level	Water	1,1,1-Trichloroethane	0.6	ug/L
EPA 624 Low Level	Water	1,1,2-Trichloroethane	0.5	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 625	Water	2,6-Dinitrotoluene	5	ug/L
EPA 625	Water	2-Chloronaphthalene	5	ug/L
EPA 625	Water	2-Chlorophenol	5	ug/L
EPA 625	Water	2-Methylphenol (o-Cresol)	10	ug/L
EPA 625	Water	2-Nitrophenol	5	ug/L
EPA 625	Water	3,3'-Dichlorobenzidine	17	ug/L
EPA 625	Water	3-Methylphenol (m-Cresol)	10	ug/L
EPA 625	Water	4,6-Dinitro-2-methylphenol	24	ug/L
EPA 625	Water	4-Bromophenylphenyl ether	5	ug/L
EPA 625	Water	4-Chloro-3-methylphenol	5	ug/L
EPA 625	Water	4-Chlorophenylphenyl ether	5	ug/L
EPA 625	Water	4-Methylphenol (p-Cresol)	10	ug/L
EPA 625	Water	4-Nitrophenol	5	ug/L
EPA 625	Water	Acenaphthene	5	ug/L
EPA 625	Water	Acenaphthylene	5	ug/L
EPA 625	Water	Anthracene	5	ug/L
EPA 625	Water	Butylbenzylphthalate	5	ug/L
EPA 625	Water	Benzo(k)fluoranthene	5	ug/L
EPA 625	Water	Benzo(g,h,i)perylene	5	ug/L
EPA 625	Water	Benzo(a)anthracene	5	ug/L
EPA 625	Water	Benzidine	44	ug/L
EPA 625	Water	Benzo(b)fluoranthene	5	ug/L
EPA 625	Water	Benzo(a)pyrene	5	ug/L
EPA 625	Water	bis(2-Chloroethoxy)methane	5	ug/L
EPA 625	Water	bis(2-Chloroethyl) ether	6	ug/L
EPA 625	Water	bis(2-Chloroisopropyl) ether	6	ug/L
EPA 625	Water	bis(2-Ethylhexyl)phthalate	5	ug/L
EPA 625	Water	Chrysene	5	ug/L
EPA 625	Water	Dibenz(a,h)anthracene	5	ug/L
EPA 625	Water	Dimethylphthalate	5	ug/L
EPA 625	Water	Di-n-butylphthalate	5	ug/L
EPA 625	Water	Di-n-octylphthalate	5	ug/L
EPA 625	Water	Diethylphthalate	5	ug/L
EPA 625	Water	Fluorene	5	ug/L
EPA 625	Water	Fluoranthene	5	ug/L
EPA 625	Water	Hexachloro-1,3-butadiene	5	ug/L
EPA 625	Water	Hexachlorobenzene	5	ug/L
EPA 625	Water	Hexachlorocyclopentadiene	5	ug/L
EPA 625	Water	Hexachloroethane	5	ug/L
EPA 625	Water	Indeno(1,2,3-cd)pyrene	5	ug/L
EPA 625	Water	Isophorone	5	ug/L
EPA 625	Water	Naphthalene	5	ug/L
EPA 625	Water	N-Nitroso-di-n-propylamine	5	ug/L
EPA 625	Water	Nitrobenzene	5	ug/L
EPA 625	Water	N-Nitrosodimethylamine	5	ug/L
EPA 625	Water	N-Nitrosodiphenylamine	5	ug/L
EPA 625	Water	Phenol	5	ug/L
EPA 625	Water	Phenanthrene	5	ug/L
EPA 625	Water	Pentachlorophenol	5	ug/L
EPA 625	Water	Pyrene	5	ug/L
EPA 680	Water	Dichlorobiphenyl	0.5	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8021B	Solid	Xylene (Total)	175	ug/kg
EPA 8021B	Water	1,2-Dichloroethane	0.5	ug/L
EPA 8021B	Water	1,2-Dibromoethane (EDB)	10	ug/L
EPA 8021B	Water	Benzene	2	ug/L
EPA 8021B	Water	Ethylbenzene	2	ug/L
EPA 8021B	Water	Methyl-tert-butyl ether	10	ug/L
EPA 8021B	Water	Naphthalene	10	ug/L
EPA 8021B	Water	Toluene	2	ug/L
EPA 8021B	Water	Xylene (Total)	7	ug/L
EPA 8021B	Leachate	Benzene	50	ug/L
EPA 8082	Oil	PCB-1016 (Aroclor 1016)	1	mg/kg
EPA 8082	Oil	PCB-1221 (Aroclor 1221)	1	mg/kg
EPA 8082	Oil	PCB-1232 (Aroclor 1232)	1	mg/kg
EPA 8082	Oil	PCB-1242 (Aroclor 1242)	1	mg/kg
EPA 8082	Oil	PCB-1248 (Aroclor 1248)	1	mg/kg
EPA 8082	Oil	PCB-1254 (Aroclor 1254)	1	mg/kg
EPA 8082	Oil	PCB-1260 (Aroclor 1260)	1	mg/kg
EPA 8082	Oil	PCB-1262 (Aroclor 1262)	1	mg/kg
EPA 8082	Oil	PCB-1268 (Aroclor 1268)	1	mg/kg
EPA 8082	Wipe	PCB-1016 (Aroclor 1016)	2	ug
EPA 8082	Wipe	PCB-1221 (Aroclor 1221)	2	ug
EPA 8082	Wipe	PCB-1232 (Aroclor 1232)	2	ug
EPA 8082	Wipe	PCB-1242 (Aroclor 1242)	2	ug
EPA 8082	Wipe	PCB-1248 (Aroclor 1248)	2	ug
EPA 8082	Wipe	PCB-1254 (Aroclor 1254)	2	ug
EPA 8082	Wipe	PCB-1260 (Aroclor 1260)	2	ug
EPA 8082	Wipe	PCB-1262 (Aroclor 1262)	2	ug
EPA 8082	Wipe	PCB-1268 (Aroclor 1268)	2	ug
EPA 8081A TCLP	Leachate	4,4'-DDT	0.03	mg/L
EPA 8081A TCLP	Leachate	gamma-BHC (Lindane)	0.4	mg/L
EPA 8081A TCLP	Leachate	Chlordane (Technical)	0.03	mg/L
EPA 8081A TCLP	Leachate	Dieldrin	0.03	mg/L
EPA 8081A TCLP	Leachate	Endrin	0.02	mg/L
EPA 8081A TCLP	Leachate	Heptachlor	0.008	mg/L
EPA 8081A TCLP	Leachate	Heptachlor epoxide	0.008	mg/L
EPA 8081A TCLP	Leachate	Methoxychlor	10	mg/L
EPA 8081A TCLP	Leachate	PCB-1016 (Aroclor 1016)	0.0075	mg/L
EPA 8081A TCLP	Leachate	PCB-1221 (Aroclor 1221)	0.0075	mg/L
EPA 8081A TCLP	Leachate	PCB-1232 (Aroclor 1232)	0.0075	mg/L
EPA 8081A TCLP	Leachate	PCB-1242 (Aroclor 1242)	0.0075	mg/L
EPA 8081A TCLP	Leachate	PCB-1248 (Aroclor 1248)	0.0075	mg/L
EPA 8081A TCLP	Leachate	PCB-1254 (Aroclor 1254)	0.0075	mg/L
EPA 8081A TCLP	Leachate	PCB-1260 (Aroclor 1260)	0.0075	mg/L
EPA 8081A TCLP	Leachate	Toxaphene	0.5	mg/L
EPA 8081A	Solid	4,4'-DDD	3.3	ug/kg
EPA 8081A	Solid	4,4'-DDE	3.3	ug/kg
EPA 8081A	Solid	4,4'-DDT	3.3	ug/kg
EPA 8081A	Solid	Aldrin	1.7	ug/kg
EPA 8081A	Solid	alpha-BHC	1.7	ug/kg
EPA 8081A	Solid	beta-BHC	1.7	ug/kg
EPA 8081A	Solid	delta-BHC	1.7	ug/kg

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8082	Solid	PCB-1260 (Aroclor 1260)	33	ug/kg
EPA 8082	Water	PCB-1016 (Aroclor 1016)	1	ug/L
EPA 8082	Water	PCB-1221 (Aroclor 1221)	1	ug/L
EPA 8082	Water	PCB-1232 (Aroclor 1232)	1	ug/L
EPA 8082	Water	PCB-1242 (Aroclor 1242)	1	ug/L
EPA 8082	Water	PCB-1248 (Aroclor 1248)	1	ug/L
EPA 8082	Water	PCB-1254 (Aroclor 1254)	1	ug/L
EPA 8082	Water	PCB-1260 (Aroclor 1260)	1	ug/L
EPA 8141	Solid	TEPP	100	ug/kg
EPA 8141	Solid	Atrazine	100	ug/kg
EPA 8141	Solid	Azinphos, methyl (Guthion)	33	ug/kg
EPA 8141	Solid	Bolstar	33	ug/kg
EPA 8141	Solid	Chlorpyrifos	33	ug/kg
EPA 8141	Solid	Coumaphos	33	ug/kg
EPA 8141	Solid	Demeton-O	33	ug/kg
EPA 8141	Solid	Demeton-S	33	ug/kg
EPA 8141	Solid	Diazinon	33	ug/kg
EPA 8141	Solid	Dimethoate	33	ug/kg
EPA 8141	Solid	Disulfoton	33	ug/kg
EPA 8141	Solid	Dichlorvos	33	ug/kg
EPA 8141	Solid	EPN (ENT)	33	ug/kg
EPA 8141	Solid	Ethoprop	33	ug/kg
EPA 8141	Solid	Famphur	33	ug/kg
EPA 8141	Solid	Fensulfothion	33	ug/kg
EPA 8141	Solid	Fenthion	33	ug/kg
EPA 8141	Solid	Malathion	67	ug/kg
EPA 8141	Solid	Methyl parathion	33	ug/kg
EPA 8141	Solid	Merphos	33	ug/kg
EPA 8141	Solid	Mevinphos	33	ug/kg
EPA 8141	Solid	Naled	100	ug/kg
EPA 8141	Solid	O,O,O-Triethylphosphorothioate	33	ug/kg
EPA 8141	Solid	Phorate	33	ug/kg
EPA 8141	Solid	Parathion (Ethyl parathion)	33	ug/kg
EPA 8141	Solid	Ronnel	33	ug/kg
EPA 8141	Solid	Sulfotepp (Thiodiphosphoric Ac	33	ug/kg
EPA 8141	Solid	Thionazin	33	ug/kg
EPA 8141	Solid	Tokuthion (Prothiofos)	33	ug/kg
EPA 8141	Solid	Trichloronate	33	ug/kg
EPA 8141	Solid	Tetrachlorovinphos	33	ug/kg
EPA 8141	Water	TEPP	8	ug/L
EPA 8141	Water	Atrazine	1	ug/L
EPA 8141	Water	Azinphos, methyl (Guthion)	1	ug/L
EPA 8141	Water	Bolstar	0.7	ug/L
EPA 8141	Water	Chlorpyrifos	0.7	ug/L
EPA 8141	Water	Coumaphos	1	ug/L
EPA 8141	Water	Demeton-O	1	ug/L
EPA 8141	Water	Demeton-S	1	ug/L
EPA 8141	Water	Diazinon	1	ug/L
EPA 8141	Water	Dimethoate	1	ug/L
EPA 8141	Water	Disulfoton	0.7	ug/L
EPA 8141	Water	Dichlorvos	2	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8141	Water	Chlorpyrifos	0.3	ug/L
EPA 8141	Water	Cyanazine	0.3	ug/L
EPA 8141	Water	Desethylatrazine	0.3	ug/L
EPA 8141	Water	Desisopropylatrazine	0.3	ug/L
EPA 8141	Water	EPTC	0.3	ug/L
EPA 8141	Water	Ethalfuralin	0.4	ug/L
EPA 8141	Water	Fonofos	0.6	ug/L
EPA 8141	Water	Malathion	0.4	ug/L
EPA 8141	Water	Methyl parathion	0.3	ug/L
EPA 8141	Water	Metolachlor	0.6	ug/L
EPA 8141	Water	Metribuzin	0.6	ug/L
EPA 8141	Water	Propachlor	1.5	ug/L
EPA 8141	Water	Pendimethalin	0.7	ug/L
EPA 8141	Water	Phorate	0.3	ug/L
EPA 8141	Water	Prometon	0.4	ug/L
EPA 8141	Water	Propazine	0.3	ug/L
EPA 8141	Water	Parathion (Ethyl parathion)	0.3	ug/L
EPA 8141	Water	Simazine	0.4	ug/L
EPA 8141	Water	Terbufos	0.3	ug/L
EPA 8141	Water	Trifluralin	0.4	ug/L
EPA 8141	Water	Triallate	0.6	ug/L
EPA 8151A TCLP	Leachate	2,4,5-T	7.5	ug/L
EPA 8151A TCLP	Leachate	2,4-D	20	ug/L
EPA 8151A TCLP	Leachate	2,4,5-TP (Silvex)	7.5	ug/L
EPA 8151A	Water	2,4,5-T	0.1	ug/L
EPA 8151A	Water	2,4-D	0.5	ug/L
EPA 8151A	Water	2,4-DB	1	ug/L
EPA 8151A	Water	MCPA	100	ug/L
EPA 8151A	Water	MCPP	100	ug/L
EPA 8151A	Water	Dalapon	2.5	ug/L
EPA 8151A	Water	Dicamba	0.1	ug/L
EPA 8151A	Water	Dinoseb	0.5	ug/L
EPA 8151A	Water	Dichloroprop	1	ug/L
EPA 8151A	Water	2,4,5-TP (Silvex)	0.1	ug/L
EPA 8151A	Solid	2,4,5-T	16	ug/kg
EPA 8151A	Solid	2,4-D	40	ug/kg
EPA 8151A	Solid	2,4-DB	160	ug/kg
EPA 8151A	Solid	MCPA	20000	ug/kg
EPA 8151A	Solid	MCPP	20000	ug/kg
EPA 8151A	Solid	Dalapon	150	ug/kg
EPA 8151A	Solid	Dicamba	16.2	ug/kg
EPA 8151A	Solid	Dinoseb	38	ug/kg
EPA 8151A	Solid	Dichloroprop	52	ug/kg
EPA 8151A	Solid	2,4,5-TP (Silvex)	15	ug/kg
EPA 8260B TCLP	Leachate	1,1-Dichloroethane	50	ug/L
EPA 8260B TCLP	Leachate	1,1-Dichloroethene	50	ug/L
EPA 8260B TCLP	Leachate	1,1,1-Trichloroethane	50	ug/L
EPA 8260B TCLP	Leachate	1,1,2,2-Tetrachloroethane	50	ug/L
EPA 8260B TCLP	Leachate	1,2-Dichloroethane	50	ug/L
EPA 8260B TCLP	Leachate	1,2-Dichloroethene (Total)	50	ug/L
EPA 8260B TCLP	Leachate	2-Butanone (MEK)	1000	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 5035/8260B	Solid	Acetone	20	ug/kg
EPA 5035/8260B	Solid	Acrolein	100	ug/kg
EPA 5035/8260B	Solid	Acetonitrile	100	ug/kg
EPA 5035/8260B	Solid	Acrylonitrile	100	ug/kg
EPA 5035/8260B	Solid	Bromochloromethane	5	ug/kg
EPA 5035/8260B	Solid	Benzene	5	ug/kg
EPA 5035/8260B	Solid	Bromobenzene	5	ug/kg
EPA 5035/8260B	Solid	Bromodichloromethane	5	ug/kg
EPA 5035/8260B	Solid	Bromomethane	5	ug/kg
EPA 5035/8260B	Solid	Bromoform	5	ug/kg
EPA 5035/8260B	Solid	cis-1,2-Dichloroethene	5	ug/kg
EPA 5035/8260B	Solid	cis-1,3-Dichloropropene	5	ug/kg
EPA 5035/8260B	Solid	Carbon tetrachloride	5	ug/kg
EPA 5035/8260B	Solid	Chlorobenzene	5	ug/kg
EPA 5035/8260B	Solid	Chloroprene	10	ug/kg
EPA 5035/8260B	Solid	Chloroethane	5	ug/kg
EPA 5035/8260B	Solid	Chloroform	5	ug/kg
EPA 5035/8260B	Solid	Chloromethane	5	ug/kg
EPA 5035/8260B	Solid	Dibromochloromethane	5	ug/kg
EPA 5035/8260B	Solid	Dichlorodifluoromethane	5	ug/kg
EPA 5035/8260B	Solid	Diisopropyl ether	5	ug/kg
EPA 5035/8260B	Solid	Dibromomethane	5	ug/kg
EPA 5035/8260B	Solid	Ethylbenzene	5	ug/kg
EPA 5035/8260B	Solid	Ethyl-tert-butyl ether	5	ug/kg
EPA 5035/8260B	Solid	Gasoline	200	ug/kg
EPA 5035/8260B	Solid	Hexachloro-1,3-butadiene	5	ug/kg
EPA 5035/8260B	Solid	Iodomethane	100	ug/kg
EPA 5035/8260B	Solid	Isopropylbenzene (Cumene)	5	ug/kg
EPA 5035/8260B	Solid	Methylene chloride	5	ug/kg
EPA 5035/8260B	Solid	Methyl-tert-butyl ether	5	ug/kg
EPA 5035/8260B	Solid	Methacrylonitrile	20	ug/kg
EPA 5035/8260B	Solid	4-Methyl-2-pentanone (MIBK)	10	ug/kg
EPA 5035/8260B	Solid	m&p-Xylene	5	ug/kg
EPA 5035/8260B	Solid	Naphthalene	5	ug/kg
EPA 5035/8260B	Solid	n-Butylbenzene	5	ug/kg
EPA 5035/8260B	Solid	n-Hexane	10	ug/kg
EPA 5035/8260B	Solid	n-Propylbenzene	5	ug/kg
EPA 5035/8260B	Solid	o-Xylene	5	ug/kg
EPA 5035/8260B	Solid	p-Isopropyltoluene	5	ug/kg
EPA 5035/8260B	Solid	Propionitrile	20	ug/kg
EPA 5035/8260B	Solid	sec-Butylbenzene	5	ug/kg
EPA 5035/8260B	Solid	Styrene	5	ug/kg
EPA 5035/8260B	Solid	trans-1,2-Dichloroethene	5	ug/kg
EPA 5035/8260B	Solid	trans-1,3-Dichloropropene	5	ug/kg
EPA 5035/8260B	Solid	trans-1,4-Dichloro-2-butene	10	ug/kg
EPA 5035/8260B	Solid	tert-Amylmethyl ether	5	ug/kg
EPA 5035/8260B	Solid	Tetrachloroethene	5	ug/kg
EPA 5035/8260B	Solid	1,1,2-Trichlorotrifluoroethane	5	ug/kg
EPA 5035/8260B	Solid	Toluene	5	ug/kg
EPA 5035/8260B	Solid	Trichloroethene	5	ug/kg
EPA 5035/8260B	Solid	Trichlorofluoromethane	5	ug/kg

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Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 5030/8260B	Solid	Chloroprene	10	ug/kg
EPA 5030/8260B	Solid	Chloroethane	5	ug/kg
EPA 5030/8260B	Solid	Chloroform	5	ug/kg
EPA 5030/8260B	Solid	Chloromethane	5	ug/kg
EPA 5030/8260B	Solid	Dibromochloromethane	5	ug/kg
EPA 5030/8260B	Solid	Dichlorodifluoromethane	5	ug/kg
EPA 5030/8260B	Solid	Diisopropyl ether	5	ug/kg
EPA 5030/8260B	Solid	Dibromomethane	5	ug/kg
EPA 5030/8260B	Solid	Ethylbenzene	5	ug/kg
EPA 5030/8260B	Solid	Ethyl-tert-butyl ether	5	ug/kg
EPA 5030/8260B	Solid	Gasoline	200	ug/kg
EPA 5030/8260B	Solid	Hexachloro-1,3-butadiene	5	ug/kg
EPA 5030/8260B	Solid	Iodomethane	100	ug/kg
EPA 5030/8260B	Solid	Isopropylbenzene (Cumene)	5	ug/kg
EPA 5030/8260B	Solid	Methylene chloride	5	ug/kg
EPA 5030/8260B	Solid	Methyl-tert-butyl ether	5	ug/kg
EPA 5030/8260B	Solid	Methacrylonitrile	20	ug/kg
EPA 5030/8260B	Solid	4-Methyl-2-pentanone (MIBK)	10	ug/kg
EPA 5030/8260B	Solid	m&p-Xylene	5	ug/kg
EPA 5030/8260B	Solid	Naphthalene	5	ug/kg
EPA 5030/8260B	Solid	n-Butylbenzene	5	ug/kg
EPA 5030/8260B	Solid	n-Hexane	10	ug/kg
EPA 5030/8260B	Solid	n-Propylbenzene	5	ug/kg
EPA 5030/8260B	Solid	o-Xylene	5	ug/kg
EPA 5030/8260B	Solid	p-Isopropyltoluene	5	ug/kg
EPA 5030/8260B	Solid	Propionitrile	20	ug/kg
EPA 5030/8260B	Solid	sec-Butylbenzene	5	ug/kg
EPA 5030/8260B	Solid	Styrene	5	ug/kg
EPA 5030/8260B	Solid	trans-1,2-Dichloroethene	5	ug/kg
EPA 5030/8260B	Solid	trans-1,3-Dichloropropene	5	ug/kg
EPA 5030/8260B	Solid	trans-1,4-Dichloro-2-butene	10	ug/kg
EPA 5030/8260B	Solid	tert-Amylmethyl ether	5	ug/kg
EPA 5030/8260B	Solid	Tetrachloroethene	5	ug/kg
EPA 5030/8260B	Solid	1,1,2-Trichlorotrifluoroethane	5	ug/kg
EPA 5030/8260B	Solid	Toluene	5	ug/kg
EPA 5030/8260B	Solid	Trichloroethene	5	ug/kg
EPA 5030/8260B	Solid	Trichlorofluoromethane	5	ug/kg
EPA 5030/8260B	Solid	tert-Butylbenzene	5	ug/kg
EPA 5030/8260B	Solid	Xylene (Total)	5	ug/kg
EPA 5030/8260B	Solid	Vinyl acetate	100	ug/kg
EPA 5030/8260B	Solid	Vinyl chloride	5	ug/kg
EPA 5030/8260B	Solid	1,2-Dichloroethane	13	ug/kg
EPA 5030/8260B	Solid	Benzene	50	ug/kg
EPA 5030/8260B	Solid	Ethylbenzene	50	ug/kg
EPA 5030/8260B	Solid	Methyl-tert-butyl ether	250	ug/kg
EPA 5030/8260B	Solid	Naphthalene	250	ug/kg
EPA 5030/8260B	Solid	Toluene	50	ug/kg
EPA 5030/8260B	Solid	Xylene (Total)	175	ug/kg
EPA 8260B-UST	Water	1,2-Dichloroethane	3	ug/L
EPA 8260B-UST	Water	Benzene	2	ug/L
EPA 8260B-UST	Water	Ethylbenzene	2	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8260B	Water	cis-1,3-Dichloropropene	5	ug/L
EPA 8260B	Water	Carbon tetrachloride	5	ug/L
EPA 8260B	Water	Chlorobenzene	5	ug/L
EPA 8260B	Water	Chloroprene	10	ug/L
EPA 8260B	Water	Chloroethane	5	ug/L
EPA 8260B	Water	Chloroform	5	ug/L
EPA 8260B	Water	Chloromethane	5	ug/L
EPA 8260B	Water	Dibromochloromethane	5	ug/L
EPA 8260B	Water	Dichlorodifluoromethane	5	ug/L
EPA 8260B	Water	Diisopropyl ether	5	ug/L
EPA 8260B	Water	Dibromomethane	5	ug/L
EPA 8260B	Water	Ethyl acrylate	100	ug/L
EPA 8260B	Water	Ethylbenzene	5	ug/L
EPA 8260B	Water	Ethyl-tert-butyl ether	5	ug/L
EPA 8260B	Water	Gasoline	50	ug/L
EPA 8260B	Water	Hexachloro-1,3-butadiene	5	ug/L
EPA 8260B	Water	Iodomethane	10	ug/L
EPA 8260B	Water	Isopropylbenzene (Cumene)	5	ug/L
EPA 8260B	Water	Methylene chloride	5	ug/L
EPA 8260B	Water	Methyl methacrylate	100	ug/L
EPA 8260B	Water	Methyl-tert-butyl ether	5	ug/L
EPA 8260B	Water	Methacrylonitrile	10	ug/L
EPA 8260B	Water	4-Methyl-2-pentanone (MIBK)	10	ug/L
EPA 8260B	Water	m&p-Xylene	5	ug/L
EPA 8260B	Water	m-Xylene	5	ug/L
EPA 8260B	Water	Naphthalene	5	ug/L
EPA 8260B	Water	n-Butylbenzene	5	ug/L
EPA 8260B	Water	n-Hexane	10	ug/L
EPA 8260B	Water	n-Propylbenzene	5	ug/L
EPA 8260B	Water	o-Xylene	5	ug/L
EPA 8260B	Water	p-Isopropyltoluene	5	ug/L
EPA 8260B	Water	Propionitrile	10	ug/L
EPA 8260B	Water	p-Xylene	5	ug/L
EPA 8260B	Water	sec-Butylbenzene	5	ug/L
EPA 8260B	Water	Styrene	5	ug/L
EPA 8260B	Water	trans-1,2-Dichloroethene	5	ug/L
EPA 8260B	Water	trans-1,3-Dichloropropene	5	ug/L
EPA 8260B	Water	trans-1,4-Dichloro-2-butene	100	ug/L
EPA 8260B	Water	tert-Amylmethyl ether	5	ug/L
EPA 8260B	Water	Tetrachloroethene	5	ug/L
EPA 8260B	Water	Tetrahydrofuran	100	ug/L
EPA 8260B	Water	1,1,2-Trichlorotrifluoroethane	5	ug/L
EPA 8260B	Water	Toluene	5	ug/L
EPA 8260B	Water	Trichloroethene	5	ug/L
EPA 8260B	Water	Trichlorofluoromethane	5	ug/L
EPA 8260B	Water	tert-Butylbenzene	5	ug/L
EPA 8260B	Water	Xylene (Total)	5	ug/L
EPA 8260B	Water	Vinyl acetate	10	ug/L
EPA 8260B	Water	Vinyl chloride	5	ug/L
EPA 8260B SPLP	Leachate	1,1-Dichloroethane	5	ug/L
EPA 8260B SPLP	Leachate	1,1-Dichloroethene	5	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8260B SPLP	Leachate	trans-1,3-Dichloropropene	5	ug/L
EPA 8260B SPLP	Leachate	Tetrachloroethene	5	ug/L
EPA 8260B SPLP	Leachate	Toluene	5	ug/L
EPA 8260B SPLP	Leachate	Trichloroethene	5	ug/L
EPA 8260B SPLP	Leachate	Trichlorofluoromethane	5	ug/L
EPA 8260B SPLP	Leachate	tert-Butylbenzene	5	ug/L
EPA 8260B SPLP	Leachate	Vinyl chloride	5	ug/L
EPA 8260B-Low Level	Water	1,1-Dichloroethane	1	ug/L
EPA 8260B-Low Level	Water	1,1-Dichloroethene	1	ug/L
EPA 8260B-Low Level	Water	1,1-Dichloropropene	1	ug/L
EPA 8260B-Low Level	Water	1,1,1-Trichloroethane	1	ug/L
EPA 8260B-Low Level	Water	1,1,2-Trichloroethane	1	ug/L
EPA 8260B-Low Level	Water	1,1,1,2-Tetrachloroethane	1	ug/L
EPA 8260B-Low Level	Water	1,1,2,2-Tetrachloroethane	1	ug/L
EPA 8260B-Low Level	Water	1,2,4-Trichlorobenzene	1	ug/L
EPA 8260B-Low Level	Water	1,2-Dichlorobenzene	1	ug/L
EPA 8260B-Low Level	Water	1,2-Dibromo-3-chloropropane	2.5	ug/L
EPA 8260B-Low Level	Water	1,2-Dichloroethane	1	ug/L
EPA 8260B-Low Level	Water	1,2-Dibromoethane (EDB)	1	ug/L
EPA 8260B-Low Level	Water	1,2-Dichloropropane	1	ug/L
EPA 8260B-Low Level	Water	1,2-Dichloroethene (Total)	1	ug/L
EPA 8260B-Low Level	Water	1,2,4-Trimethylbenzene	1	ug/L
EPA 8260B-Low Level	Water	1,2,3-Trichlorobenzene	1	ug/L
EPA 8260B-Low Level	Water	1,2,3-Trichloropropane	2.5	ug/L
EPA 8260B-Low Level	Water	1,3-Dichlorobenzene	1	ug/L
EPA 8260B-Low Level	Water	1,3-Dichloropropane	1	ug/L
EPA 8260B-Low Level	Water	1,3,5-Trimethylbenzene	1	ug/L
EPA 8260B-Low Level	Water	1,4-Dichlorobenzene	1	ug/L
EPA 8260B-Low Level	Water	1,4-Dioxane (p-Dioxane)	100	ug/L
EPA 8260B-Low Level	Water	1-Chlorohexane	1	ug/L
EPA 8260B-Low Level	Water	2,2-Dichloropropane	1	ug/L
EPA 8260B-Low Level	Water	2-Butanone (MEK)	10	ug/L
EPA 8260B-Low Level	Water	2-Chlorotoluene	1	ug/L
EPA 8260B-Low Level	Water	2-Chloroethylvinyl ether	10	ug/L
EPA 8260B-Low Level	Water	2-Hexanone	10	ug/L
EPA 8260B-Low Level	Water	2-Methylnaphthalene	5	ug/L
EPA 8260B-Low Level	Water	2-Propanol	500	ug/L
EPA 8260B-Low Level	Water	Allyl chloride	10	ug/L
EPA 8260B-Low Level	Water	4-Chlorotoluene	1	ug/L
EPA 8260B-Low Level	Water	Carbon disulfide	10	ug/L
EPA 8260B-Low Level	Water	Acetone	10	ug/L
EPA 8260B-Low Level	Water	Acrolein	20	ug/L
EPA 8260B-Low Level	Water	Acetonitrile	100	ug/L
EPA 8260B-Low Level	Water	Acrylonitrile	20	ug/L
EPA 8260B-Low Level	Water	Bromochloromethane	1	ug/L
EPA 8260B-Low Level	Water	Benzene	1	ug/L
EPA 8260B-Low Level	Water	bis-Chloromethyl ether	50	ug/L
EPA 8260B-Low Level	Water	Bromoethane	10	ug/L
EPA 8260B-Low Level	Water	Bromobenzene	1	ug/L
EPA 8260B-Low Level	Water	Bromodichloromethane	1	ug/L
EPA 8260B-Low Level	Water	Bromomethane	1	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8270C	Solid	1,4-Dichlorobenzene	330	ug/kg
EPA 8270C	Solid	1-Methylnaphthalene	330	ug/kg
EPA 8270C	Solid	1-Naphthaleneamine	330	ug/kg
EPA 8270C	Solid	2,4,6-Trichlorophenol	330	ug/kg
EPA 8270C	Solid	2,4-Dichlorophenol	330	ug/kg
EPA 8270C	Solid	2,4-Dimethylphenol	330	ug/kg
EPA 8270C	Solid	2,4-Dinitrophenol	1600	ug/kg
EPA 8270C	Solid	2,4-Dinitrotoluene	330	ug/kg
EPA 8270C	Solid	2,4,5-Trichlorophenol	330	ug/kg
EPA 8270C	Solid	2,6-Dichlorophenol	330	ug/kg
EPA 8270C	Solid	2,6-Dinitrotoluene	330	ug/kg
EPA 8270C	Solid	2-Acetylaminofluorene	330	ug/kg
EPA 8270C	Solid	2-Amino-2-methylpropanol	330	ug/kg
EPA 8270C	Solid	2-Chloronaphthalene	330	ug/kg
EPA 8270C	Solid	2-Chlorophenol	330	ug/kg
EPA 8270C	Solid	2-Methyl-5-nitroaniline	330	ug/kg
EPA 8270C	Solid	2-Methylphenol (o-Cresol)	330	ug/kg
EPA 8270C	Solid	2-Methylnaphthalene	330	ug/kg
EPA 8270C	Solid	2-Nitroaniline	1600	ug/kg
EPA 8270C	Solid	2-Nitrophenol	330	ug/kg
EPA 8270C	Solid	2-Picoline	330	ug/kg
EPA 8270C	Solid	3,3'-Dichlorobenzidine	660	ug/kg
EPA 8270C	Solid	3-Methylphenol (m-Cresol)	330	ug/kg
EPA 8270C	Solid	3-Nitroaniline	1600	ug/kg
EPA 8270C	Solid	4,6-Dinitro-2-methylphenol	1600	ug/kg
EPA 8270C	Solid	4-Bromophenylphenyl ether	330	ug/kg
EPA 8270C	Solid	4-Chloro-3-methylphenol	660	ug/kg
EPA 8270C	Solid	4-Chloroaniline	660	ug/kg
EPA 8270C	Solid	4-Chlorophenylphenyl ether	330	ug/kg
EPA 8270C	Solid	4-Methylphenol (p-Cresol)	330	ug/kg
EPA 8270C	Solid	4-Nitroaniline	1600	ug/kg
EPA 8270C	Solid	4-Nitrophenol	1600	ug/kg
EPA 8270C	Solid	7,12-Dimethylbenz(a)anthracene	1600	ug/kg
EPA 8270C	Solid	N,N-Dimethylformamide	330	ug/kg
EPA 8270C	Solid	Acenaphthene	330	ug/kg
EPA 8270C	Solid	Acenaphthylene	330	ug/kg
EPA 8270C	Solid	Acetophenone	330	ug/kg
EPA 8270C	Solid	Aniline	330	ug/kg
EPA 8270C	Solid	Anthracene	330	ug/kg
EPA 8270C	Solid	Aramite	330	ug/kg
EPA 8270C	Solid	Butylbenzylphthalate	330	ug/kg
EPA 8270C	Solid	Benzoic acid	1600	ug/kg
EPA 8270C	Solid	Benzyl alcohol	660	ug/kg
EPA 8270C	Solid	Benzo(k)fluoranthene	330	ug/kg
EPA 8270C	Solid	Benzo(g,h,i)perylene	330	ug/kg
EPA 8270C	Solid	Benzo(a)anthracene	330	ug/kg
EPA 8270C	Solid	Benzidine	1600	ug/kg
EPA 8270C	Solid	Benzo(b)fluoranthene	330	ug/kg
EPA 8270C	Solid	Benzo(a)pyrene	330	ug/kg
EPA 8270C	Solid	Biphenyl (Diphenyl)	330	ug/kg
EPA 8270C	Solid	bis(2-Chloroethoxy)methane	330	ug/kg

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8270C	Solid	Quinoline	330	ug/kg
EPA 8270C	Solid	Safrole	330	ug/kg
EPA 8270C	Water	1,2,4-Trichlorobenzene	10	ug/L
EPA 8270C	Water	1,2-Dichlorobenzene	10	ug/L
EPA 8270C	Water	1,2-Diphenylhydrazine	20	ug/L
EPA 8270C	Water	1,3-Dichlorobenzene	10	ug/L
EPA 8270C	Water	1,3-Dinitrobenzene	10	ug/L
EPA 8270C	Water	1,3,5-Trinitrobenzene	10	ug/L
EPA 8270C	Water	1,4-Dichlorobenzene	10	ug/L
EPA 8270C	Water	1,4-Naphthoquinone	50	ug/L
EPA 8270C	Water	1,2,4,5-Tetrachlorobenzene	10	ug/L
EPA 8270C	Water	1-Methylnaphthalene	10	ug/L
EPA 8270C	Water	1-Naphthaleneamine	10	ug/L
EPA 8270C	Water	2,3,4,6-Tetrachlorophenol	10	ug/L
EPA 8270C	Water	2,4,6-Trichlorophenol	10	ug/L
EPA 8270C	Water	2,4-Dichlorophenol	10	ug/L
EPA 8270C	Water	2,4-Dimethylphenol	10	ug/L
EPA 8270C	Water	2,4-Dinitrophenol	50	ug/L
EPA 8270C	Water	2,4-Dinitrotoluene	10	ug/L
EPA 8270C	Water	2,4,5-Trichlorophenol	50	ug/L
EPA 8270C	Water	2,6-Dichlorophenol	10	ug/L
EPA 8270C	Water	2,6-Dinitrotoluene	10	ug/L
EPA 8270C	Water	2-Acetylaminofluorene	10	ug/L
EPA 8270C	Water	2-Amino-2-methylpropanol	10	ug/L
EPA 8270C	Water	2-Chloronaphthalene	10	ug/L
EPA 8270C	Water	2-Chlorophenol	10	ug/L
EPA 8270C	Water	2-Methyl-5-nitroaniline	10	ug/L
EPA 8270C	Water	2-Methylphenol (o-Cresol)	10	ug/L
EPA 8270C	Water	2-Methylnaphthalene	10	ug/L
EPA 8270C	Water	2-Nitroaniline	50	ug/L
EPA 8270C	Water	2-Naphthaleneamine	10	ug/L
EPA 8270C	Water	2-Nitrophenol	10	ug/L
EPA 8270C	Water	2-Picoline	10	ug/L
EPA 8270C	Water	3,3'-Dichlorobenzidine	20	ug/L
EPA 8270C	Water	3,3'-Dimethylbenzidine	10	ug/L
EPA 8270C	Water	3-Methylcholanthrene	10	ug/L
EPA 8270C	Water	3-Methylphenol (m-Cresol)	20	ug/L
EPA 8270C	Water	3-Nitroaniline	50	ug/L
EPA 8270C	Water	4,6-Dinitro-2-methylphenol	50	ug/L
EPA 8270C	Water	4-Aminobiphenyl	10	ug/L
EPA 8270C	Water	4-Bromophenylphenyl ether	10	ug/L
EPA 8270C	Water	4-Chloro-3-methylphenol	20	ug/L
EPA 8270C	Water	4-Chloroaniline	20	ug/L
EPA 8270C	Water	4-Chlorophenylphenyl ether	10	ug/L
EPA 8270C	Water	4-Methylphenol (p-Cresol)	10	ug/L
EPA 8270C	Water	4-Nitroaniline	50	ug/L
EPA 8270C	Water	4-Nitrophenol	50	ug/L
EPA 8270C	Water	4-Nitroquinoline-n-oxide	10	ug/L
EPA 8270C	Water	7,12-Dimethylbenz(a)anthracene	50	ug/L
EPA 8270C	Water	N,N-Dimethylformamide	10	ug/L
EPA 8270C	Water	a,a-Dimethylphenylethylamine	10	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8270C	Water	Methapyrilene	10	ug/L
EPA 8270C	Water	Methyl methanesulfonate	10	ug/L
EPA 8270C	Water	6-Methylchrysene	50	ug/L
EPA 8270C	Water	Naphthalene	10	ug/L
EPA 8270C	Water	N-Nitroso-di-n-butylamine	10	ug/L
EPA 8270C	Water	N-Nitroso-di-n-propylamine	10	ug/L
EPA 8270C	Water	Nitrobenzene	10	ug/L
EPA 8270C	Water	N-methyl-2-pyrrolidone	10	ug/L
EPA 8270C	Water	N-Nitrosodiethylamine	10	ug/L
EPA 8270C	Water	N-Nitrosodimethylamine	20	ug/L
EPA 8270C	Water	N-Nitrosodiphenylamine	10	ug/L
EPA 8270C	Water	N-Nitrosopiperidine	10	ug/L
EPA 8270C	Water	N-Nitrosomethylethylamine	10	ug/L
EPA 8270C	Water	N-Nitrosomorpholine	10	ug/L
EPA 8270C	Water	N-Nitrosopyrrolidine	10	ug/L
EPA 8270C	Water	O-Toluidine	10	ug/L
EPA 8270C	Water	P-Dimethylaminoazobenzene	10	ug/L
EPA 8270C	Water	Phenacetin	10	ug/L
EPA 8270C	Water	Phenol	10	ug/L
EPA 8270C	Water	Phenanthrene	10	ug/L
EPA 8270C	Water	p-Phenylenediamine	10	ug/L
EPA 8270C	Water	Pronamide	10	ug/L
EPA 8270C	Water	Pentachlorobenzene	10	ug/L
EPA 8270C	Water	Pentachloroethane	10	ug/L
EPA 8270C	Water	Pentachlorophenol	50	ug/L
EPA 8270C	Water	Pentachloronitrobenzene	10	ug/L
EPA 8270C	Water	Pyrene	10	ug/L
EPA 8270C	Water	Pyridine	10	ug/L
EPA 8270C	Water	Quinoline	10	ug/L
EPA 8270C	Water	Safrole	10	ug/L
EPA 8270C TCLP	Leachate	1,4-Dichlorobenzene	100	ug/L
EPA 8270C TCLP	Leachate	1-Methylnaphthalene	100	ug/L
EPA 8270C TCLP	Leachate	2,4,6-Trichlorophenol	100	ug/L
EPA 8270C TCLP	Leachate	2,4-Dichlorophenol	100	ug/L
EPA 8270C TCLP	Leachate	2,4-Dimethylphenol	100	ug/L
EPA 8270C TCLP	Leachate	2,4-Dinitrotoluene	100	ug/L
EPA 8270C TCLP	Leachate	2,4,5-Trichlorophenol	500	ug/L
EPA 8270C TCLP	Leachate	2-Methylphenol (o-Cresol)	100	ug/L
EPA 8270C TCLP	Leachate	2-Methylnaphthalene	100	ug/L
EPA 8270C TCLP	Leachate	3-Methylphenol (m-Cresol)	200	ug/L
EPA 8270C TCLP	Leachate	4-Methylphenol (p-Cresol)	100	ug/L
EPA 8270C TCLP	Leachate	Acenaphthene	50	ug/L
EPA 8270C TCLP	Leachate	Acenaphthylene	100	ug/L
EPA 8270C TCLP	Leachate	Aniline	100	ug/L
EPA 8270C TCLP	Leachate	Anthracene	50	ug/L
EPA 8270C TCLP	Leachate	Benzo(k)fluoranthene	100	ug/L
EPA 8270C TCLP	Leachate	Benzo(g,h,i)perylene	100	ug/L
EPA 8270C TCLP	Leachate	Benzo(a)anthracene	50	ug/L
EPA 8270C TCLP	Leachate	Benzidine	500	ug/L
EPA 8270C TCLP	Leachate	Benzo(a)pyrene	50	ug/L
EPA 8270C TCLP	Leachate	bis(2-Ethylhexyl)phthalate	50	ug/L

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Lenexa, Kansas Laboratory

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8270C SPLP	Leachate	Naphthalene	50	ug/L
EPA 8270C SPLP	Leachate	Nitrobenzene	100	ug/L
EPA 8270C SPLP	Leachate	Phenol	50	ug/L
EPA 8270C SPLP	Leachate	Phenanthrene	50	ug/L
EPA 8270C SPLP	Leachate	Pentachlorophenol	500	ug/L
EPA 8270C SPLP	Leachate	Pyrene	50	ug/L
EPA 8270C SPLP	Leachate	Pyridine	100	ug/L
EPA 8310	Solid	Acenaphthene	16.7	ug/kg
EPA 8310	Solid	Acenaphthylene	33.3	ug/kg
EPA 8310	Solid	Anthracene	3.4	ug/kg
EPA 8310	Solid	Benzo(k)fluoranthene	3.4	ug/kg
EPA 8310	Solid	Benzo(g,h,i)perylene	10	ug/kg
EPA 8310	Solid	Benzo(a)anthracene	5	ug/kg
EPA 8310	Solid	Benzo(b)fluoranthene	3.3	ug/kg
EPA 8310	Solid	Benzo(a)pyrene	5	ug/kg
EPA 8310	Solid	Chrysene	3.4	ug/kg
EPA 8310	Solid	Dibenz(a,h)anthracene	10	ug/kg
EPA 8310	Solid	Fluorene	15	ug/kg
EPA 8310	Solid	Fluoranthene	10	ug/kg
EPA 8310	Solid	Indeno(1,2,3-cd)pyrene	3.4	ug/kg
EPA 8310	Solid	Naphthalene	50	ug/kg
EPA 8310	Solid	Phenanthrene	5	ug/kg
EPA 8310	Solid	Pyrene	5	ug/kg
EPA 8310	Water	Acenaphthene	0.5	ug/L
EPA 8310	Water	Acenaphthylene	1	ug/L
EPA 8310	Water	Anthracene	0.05	ug/L
EPA 8310	Water	Benzo(k)fluoranthene	0.1	ug/L
EPA 8310	Water	Benzo(g,h,i)perylene	0.1	ug/L
EPA 8310	Water	Benzo(a)anthracene	0.1	ug/L
EPA 8310	Water	Benzo(b)fluoranthene	0.1	ug/L
EPA 8310	Water	Benzo(a)pyrene	0.1	ug/L
EPA 8310	Water	Chrysene	0.1	ug/L
EPA 8310	Water	Dibenz(a,h)anthracene	0.1	ug/L
EPA 8310	Water	Fluorene	0.1	ug/L
EPA 8310	Water	Fluoranthene	0.1	ug/L
EPA 8310	Water	Indeno(1,2,3-cd)pyrene	0.1	ug/L
EPA 8310	Water	Naphthalene	0.5	ug/L
EPA 8310	Water	Phenanthrene	0.1	ug/L
EPA 8310	Water	Pyrene	0.1	ug/L
EPA 9010B	Solid	Cyanide	0.05	mg/kg
EPA 9010B	Water	Cyanide	0.005	mg/L
EPA 9034	Solid	Sulfide	5	mg/kg
EPA 9034	Water	Sulfide	0.2	mg/L
EPA 9050A	Solid	Specific Conductance	1	umohs/cm
EPA 9071B	Solid	Oil and Grease	5	mg/kg
EPA 9081	Solid	Cation Exchange Capacity	0.1	S..
EPA 9095A	Solid	Free Liquids		
SM5540 C	Water	Surfactants	0.2	mg/L
Oklahoma DRO	Solid	Diesel Range Organics	10	mg/kg
Oklahoma DRO	Water	Diesel Range Organics	0.1	mg/L
F001-F005	Solid	1,1,1-Trichloroethane	100	mg/kg

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
F001-F005	Water	Acetone	10	mg/L
F001-F005	Water	Benzene	10	mg/L
F001-F005	Water	Carbon tetrachloride	10	mg/L
F001-F005	Water	Chlorobenzene	10	mg/L
F001-F005	Water	Cyclohexanone	10	mg/L
F001-F005	Water	Diethyl ether (Ethyl ether)	10	mg/L
F001-F005	Water	d-Limonene	10	mg/L
F001-F005	Water	Ethyl acetate	10	mg/L
F001-F005	Water	Ethylbenzene	10	mg/L
F001-F005	Water	Ethylene glycol	10	mg/L
F001-F005	Water	Isobutanol	10	mg/L
F001-F005	Water	Methylene chloride	10	mg/L
F001-F005	Water	4-Methyl-2-pentanone (MIBK)	10	mg/L
F001-F005	Water	Methanol	10	mg/L
F001-F005	Water	n-Butanol	10	mg/L
F001-F005	Water	Nitrobenzene	10	mg/L
F001-F005	Water	Propylene glycol	10	mg/L
F001-F005	Water	Pyridine	10	mg/L
F001-F005	Water	Tetrachloroethene	10	mg/L
F001-F005	Water	1,1,2-Trichlorotrifluoroethane	10	mg/L
F001-F005	Water	Toluene	10	mg/L
F001-F005	Water	Trichloroethene	10	mg/L
F001-F005	Water	Trichlorofluoromethane	10	mg/L
F001-F005	Water	Xylene (Total)	10	mg/L
EPA 8015	Solid	Gasoline Range Hydrocarbons	5	mg/kg
EPA 8015	Water	Gasoline Range Hydrocarbons	0.5	mg/L
Oklahoma GRO	Solid	1,2,4-Trimethylbenzene	10	ug/kg
Oklahoma GRO	Solid	1,3,5-Trimethylbenzene	10	ug/kg
Oklahoma GRO	Solid	Benzene	10	ug/kg
Oklahoma GRO	Solid	Ethylbenzene	10	ug/kg
Oklahoma GRO	Solid	Gasoline Range Organics	100	ug/kg
Oklahoma GRO	Solid	Methyl-tert-butyl ether	10	ug/kg
Oklahoma GRO	Solid	Naphthalene	10	ug/kg
Oklahoma GRO	Solid	Toluene	10	ug/kg
Oklahoma GRO	Solid	Xylene (Total)	25	ug/kg
Oklahoma GRO	Water	1,2,4-Trimethylbenzene	2	ug/L
Oklahoma GRO	Water	1,3,5-Trimethylbenzene	2	ug/L
Oklahoma GRO	Water	Benzene	2	ug/L
Oklahoma GRO	Water	Ethylbenzene	2	ug/L
Oklahoma GRO	Water	Gasoline Range Organics	50	ug/L
Oklahoma GRO	Water	Methyl-tert-butyl ether	10	ug/L
Oklahoma GRO	Water	Naphthalene	10	ug/L
Oklahoma GRO	Water	Toluene	2	ug/L
Oklahoma GRO	Water	Xylene (Total)	5	ug/L
OA1	Solid	BTEX (Total)	280	ug/kg
OA1	Solid	Benzene	50	ug/kg
OA1	Solid	Ethylbenzene	50	ug/kg
OA1	Solid	Gasoline Range Hydrocarbons	5000	ug/kg
OA1	Solid	Methyl-tert-butyl ether	260	ug/kg
OA1	Solid	Naphtha	5000	ug/kg
OA1	Solid	Naphthalene	260	ug/kg

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8015 Modified	Water	Jet Fuel	0.4	mg/L
EPA 8015 Modified	Water	Kerosene	0.4	mg/L
EPA 8015 Modified	Water	Mineral Spirits	0.4	mg/L
EPA 8015 Modified	Water	Motor Oil	0.4	mg/L
EPA 8015 Modified	Water	Transformer Oil	0.4	mg/L
EPA 8015 Modified	Water	Total Petroleum Hydrocarbons	0.4	mg/L
EPA 8015 Modified	Solid	Diesel Fuel	10	mg/kg
EPA 8015 Modified	Solid	Fuel Oil	10	mg/kg
EPA 8015 Modified	Solid	Gasoline	10	mg/kg
EPA 8015 Modified	Solid	Hydraulic Fluid	10	mg/kg
EPA 8015 Modified	Solid	Jet Fuel	10	mg/kg
EPA 8015 Modified	Solid	Kerosene	10	mg/kg
EPA 8015 Modified	Solid	Mineral Spirits	10	mg/kg
EPA 8015 Modified	Solid	Motor Oil	10	mg/kg
EPA 8015 Modified	Solid	Transformer Oil	10	mg/kg
EPA 8015 Modified	Solid	Total Petroleum Hydrocarbons	10	mg/kg

SOP DIRECTORY

PASI KANSAS CITY LABORATORY

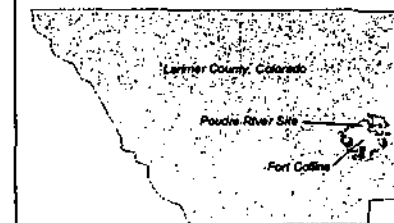
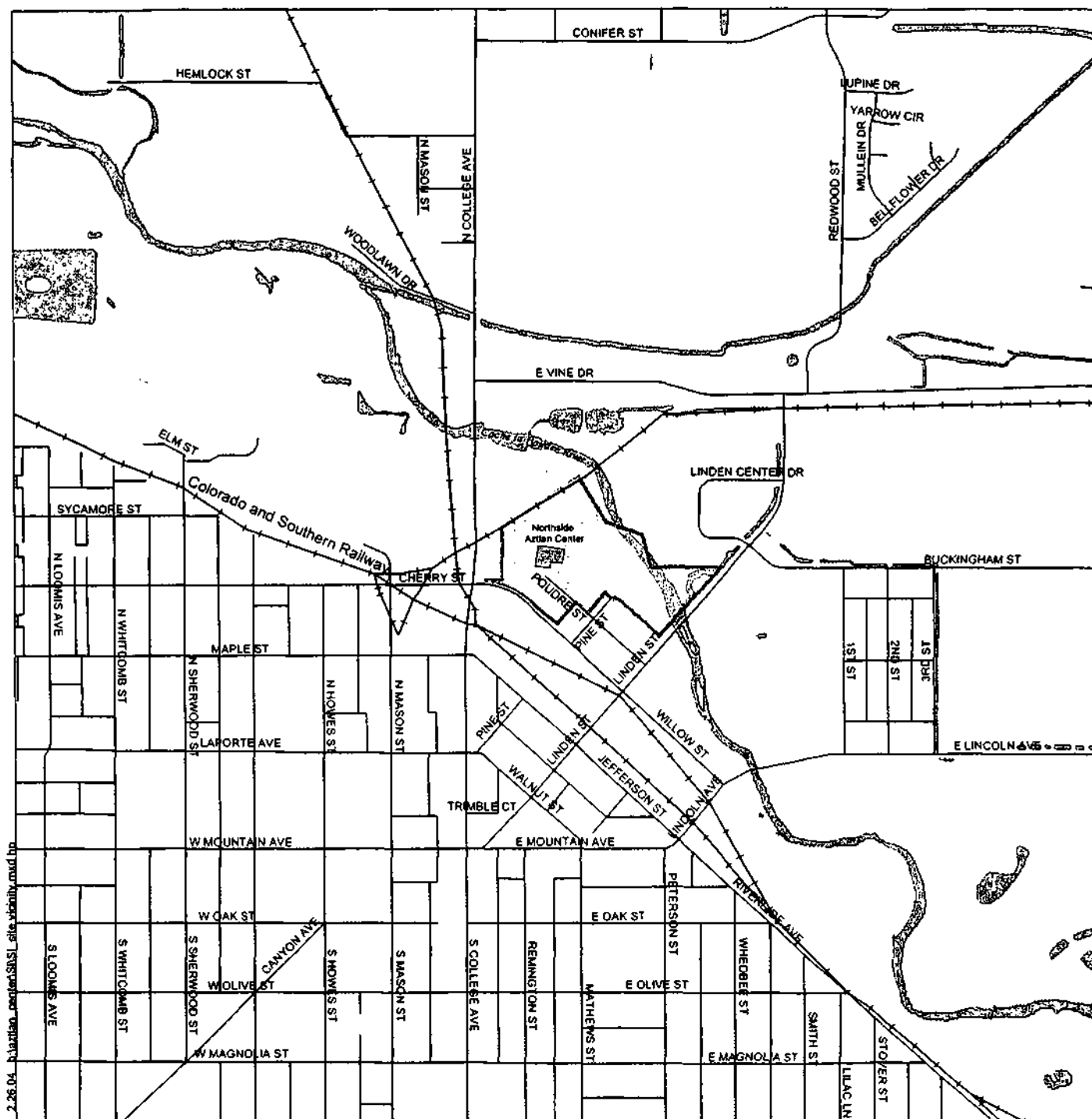
16-May-02

SOP #	Title	LAST REVISION
ALL-P-001-C	PREPARATION OF SOPS	12/14/01
ALL-P-104-A	METHOD DETECTION LIMIT STUDIES	4/15/02
KS-I-2300-D	ACIDITY (TITRIMETRIC ASSAY)	6/27/01
KS-I-2301-E	ALKALINITY,AUTOMATED IN WATER AND SOIL	4/30/01
KS-I-2302-E	AMMONIA, NITROGEN	5/9/01
KS-I-2305-D	BOD AND CBOD	6/25/01
KS-I-2308-E	COD WATERS-COLOMETRIC METHOD	5/31/01
KS-I-2310-D	RESIDUAL CHLORINE, TOTAL AND FREE	5/16/01
KS-I-2311-G	HEX CHROME WATER	5/21/01
KS-I-2312-B	HEX CHROME SOIL	5/25/01
KS-I-2316-E	DISSOLVED OXYGEN-ELECTRODE METHOD	6/27/01
KS-I-2317-A	FERROUS IRON, DISSOLVED AND TOTAL	8/1/01
KS-I-2320-E	TOTAL KJELDAHL NITROGEN	5/7/01
KS-I-2326-C	OIL & GREASE BY METHOD 1664	4/26/02
KS-I-2329-D	TOTAL ORGANIC CARBON	6/4/01
KS-I-2330-A	TURBIDITY	6/14/01
KS-I-2331-E	pH IN WATER AND SOIL	6/4/01
KS-I-2332-D	PHENOLICS, TOTAL RECOVERABLE	5/15/01
KS-I-2334-E	TOTAL SOLIDS	6/1/01
KS-I-2335-E	TOTAL DISSOLVED SOLIDS	6/4/01
KS-I-2336-F	SOLIDS, TOTAL SUSPENDED	4/29/02
KS-I-2337-E	TOTAL SETTLEABLE SOLIDS	6/4/01
KS-I-2338-E	VOLATILE SOLIDS	6/14/01
KS-I-2340-E	CONDUCTANCE	6/4/01
KS-I-2341-C	DISSOLVED SILICA	6/27/01
KS-I-2342-C	SULFIDE	5/25/01

SOP #	Title	LAST REVISION
KS-I-4313-C	METALS PREP 3010A	4/2/01
KS-I-4314-C	METALS PREP 3020A	4/26/01
KS-I-4315-C	METALS PREP 3050A	4/26/01
KS-I-4316-A	METALS IN WIPE PREPARATION	5/1/02
KS-I-4317-A	METALS IN PAINT CHIPS PREPARATION	3/11/02
KS-I-4320-F	METALS BY ICP 6010 AND 200.7	4/3/02
KS-I-4321-A	FURNACE METALS(Sb,Pb,As,Th,Se) BY METHOD 200.9	4/2/01
KS-I-4329-B	MERCURY BY 7470a, 7471a, 245.1, 245.5	4/26/01
KS-I-4330-A	MERCURY PREPARATION & ANALYSIS (HOT BLOCK)	7/2/01
KS-I-4331-C	A.A. GRAPHITE FURNACE- Sb, As, Pb, Se, & Tl 7000	5/1/01
KS-I-4340-A	CATION EXCHANGE CAPACITY	7/11/01
KS-I-4341-A	POTASSIUM EXCHANGE	3/11/02
KS-O-5340-C	TCLP & ZHE EXTRACTION	6/27/01
KS-O-5350-B	EXTRACTION SPIKE FORTIFICATION VERIFICATION	2/1/01
KS-O-6310-B	PAHs IN SOIL & WATER BY EPA 8310	3/14/02
KS-O-6311-H	HERBICIDES IN SOIL & WATER BY 8151A	3/15/01
KS-O-6314-E	PCBS IN OILS, WIPES AND SWABS BY 8082	3/23/01
KS-O-6317-F	PCBS IN WATER & SOIL BY EPA 8082	3/23/01
KS-O-6319-H	PESTICIDES IN SOIL & WATER BY 8081A	3/20/01
KS-O-6320-D	EXTRACTABLE PETROLEUM HYDROCARBONS BY OA2	3/23/01
KS-O-6323-G	EXTRACTABLE PETROLEUM HYDROCARBONS BY 8015M	3/23/01
KS-O-6326-E	ORGANOPHOSPHOROUS PESTICIDES BY 8141A	4/2/01
KS-O-6328-E	EDB AND DBCP IN WATER AND SOIL BY METHOD 8011	3/14/01
KS-O-6330-F	BIS(2ETHYL HEXYL)PHTHALATE BY EPA 606	7/2/01
KS-O-6331-E	VOCS IN WATER, GC 601/602	3/15/01
KS-O-6332-E	VOCS IN WATER BY EPA 8021B	4/2/01
KS-O-6333-D	GAS/BTEX IN SOIL AND WATER 8015M/8021B	4/2/01
KS-O-6343-C	ORGANOCHLORINE PEST/PCB IN W 608	3/15/01





SOP #	Title	LAST REVISION
KS-Q-1204-A	REAGENT WATER QUALITY	1/15/02
KS-Q-1205-A	SIGNIFICANT FIGURES AND ROUNDING RULES	1/16/02
KS-Q-1206-A	VOLATILE STORAGE BLANKS	1/18/02
KS-Q-1207-A	CALIBRATION OF THERMOMETERS	1/16/02
KS-Q-1208-A	CALIBRATION OF BALANCES AND WEIGHTS	1/18/02
KS-Q-1209-A	CALIBRATION OF PIPETS	1/30/02
KS-Q-1211-A	EMPLOYEE TRAINING PROCEDURES	2/27/02
KS-Q-1212-A	MONITORING OF TEMPERATURES IN THE LABORATORY	2/26/02
KS-Q-1213-A	TRIP BLANK PREPARATION AND MONITORING	4/3/02
KS-Q-1214-A	RESERVED	5/1/02
KS-Q-1215-A	RESERVED	5/1/02
KS-Q-1216-A	RESERVED	5/1/02
KS-Q-1217-A	RESERVED	5/1/02
KS-Q-1218-A	RESERVED	5/1/02

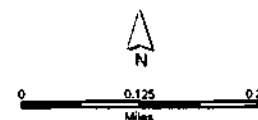
FIGURES



Location Map

Legend

-  Railroad
 Street
 Water
 Site Outline



**POUDRE RIVER REMOVAL
SITE ASSESSMENT
LARIMER COUNTY, COLORADO**

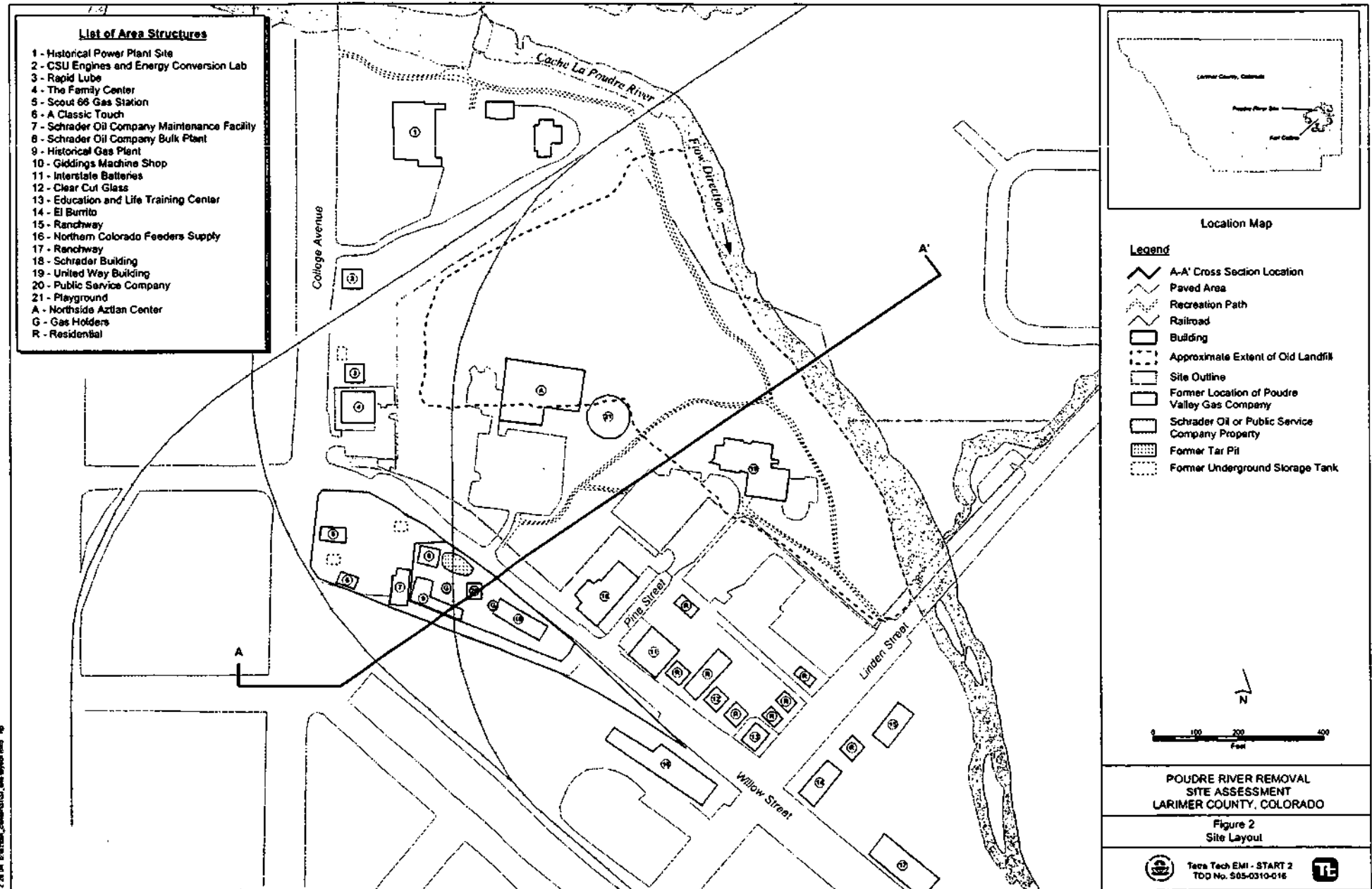
Figure 1
Site Location

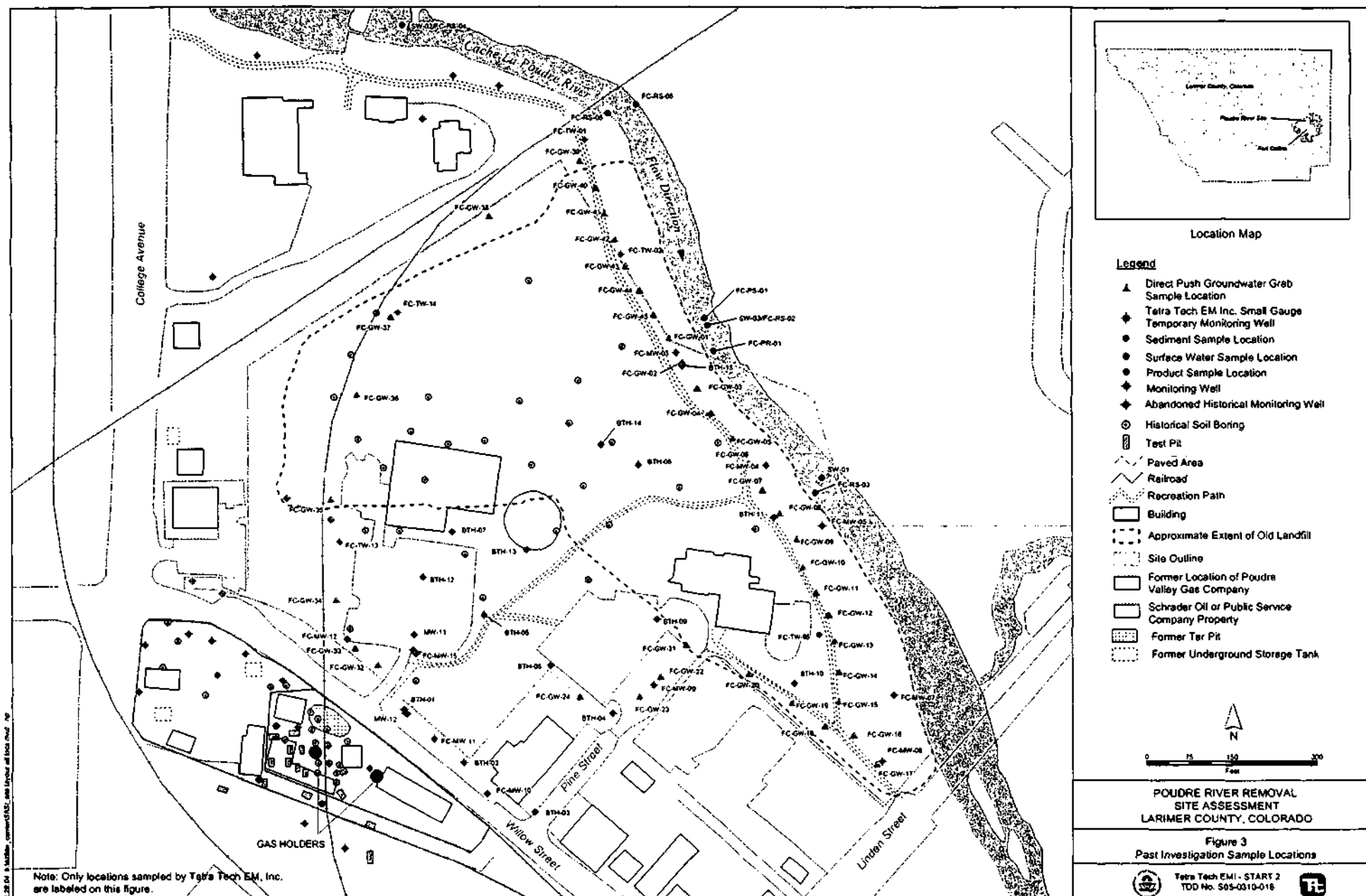


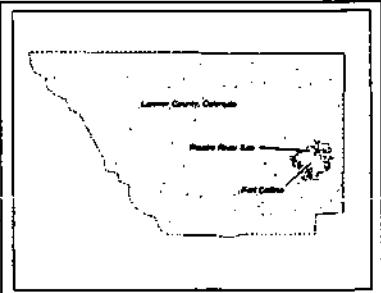
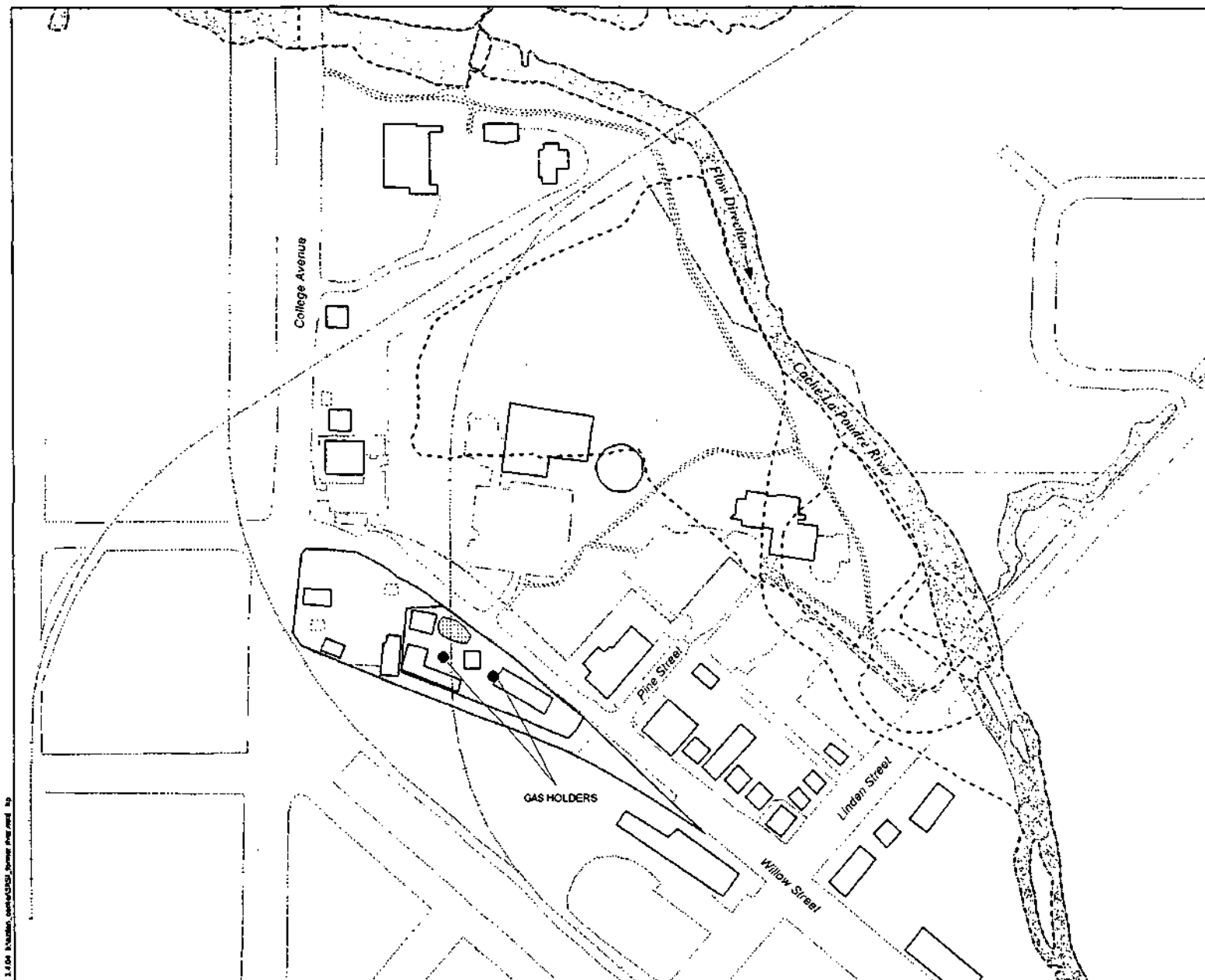
Tetra Tech EMI - START 2
TDD No. 505-0310-016



- 1 - Historical Power Plant Site
- 2 - CSU Engines and Energy Conversion Lab
- 3 - Rapid Lube
- 4 - The Family Center
- 5 - Scout 86 Gas Station
- 6 - A Classic Touch
- 7 - Schrader Oil Company Maintenance Facility
- 8 - Schrader Oil Company Bulk Plant
- 9 - Historical Gas Plant
- 10 - Giddings Machine Shop
- 11 - Interstate Batteries
- 12 - Clear Cut Glass
- 13 - Education and Life Training Center
- 14 - El Burrito
- 15 - Ranchway
- 16 - Northern Colorado Feeders Supply
- 17 - Ranchway
- 18 - Schrader Building
- 19 - United Way Building
- 20 - Public Service Company
- 21 - Playground
- A - Northside Aztlan Center
- G - Gas Holders
- R - Residential



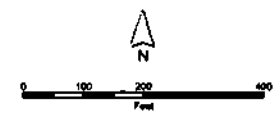




Location Map

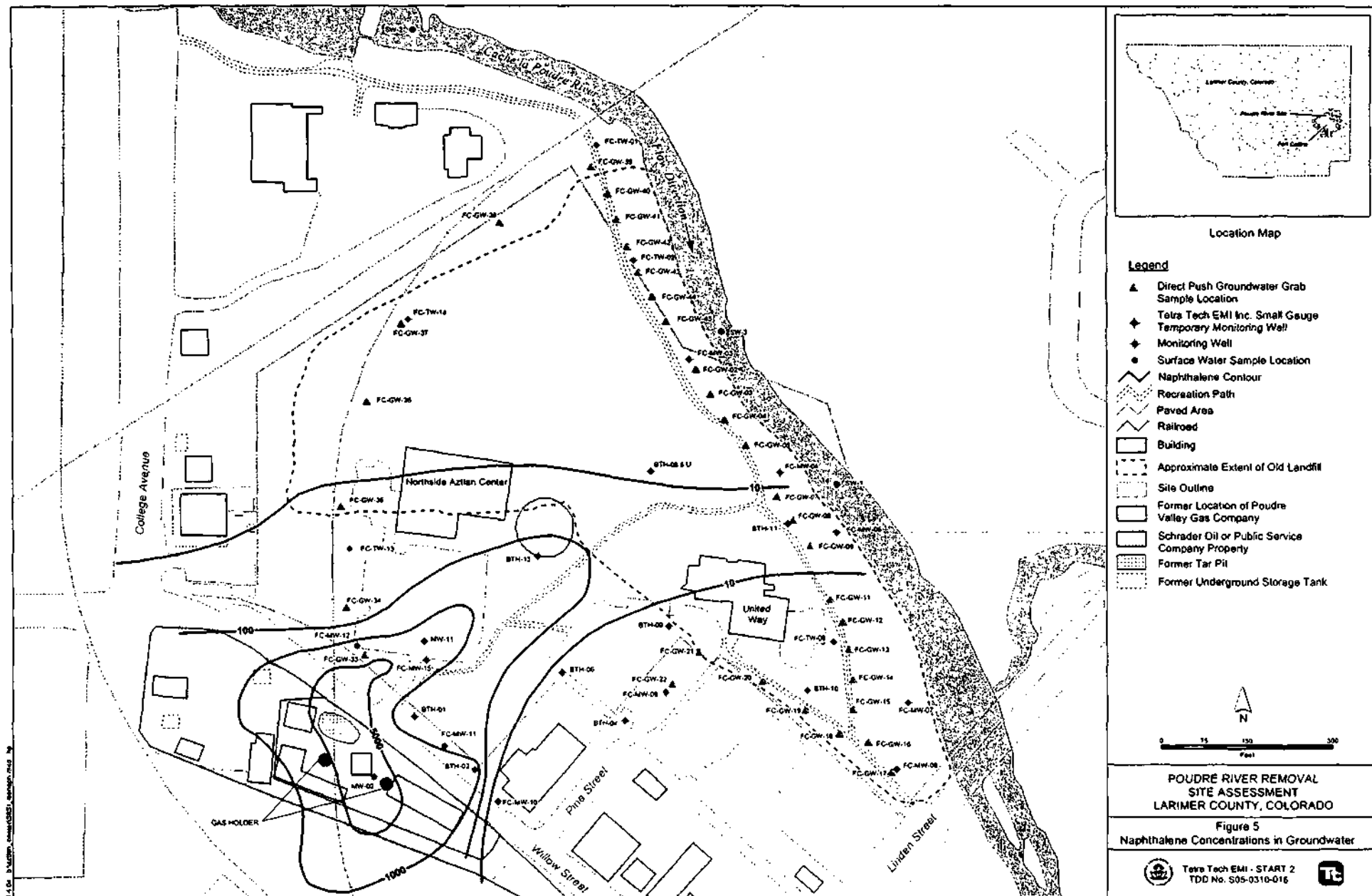
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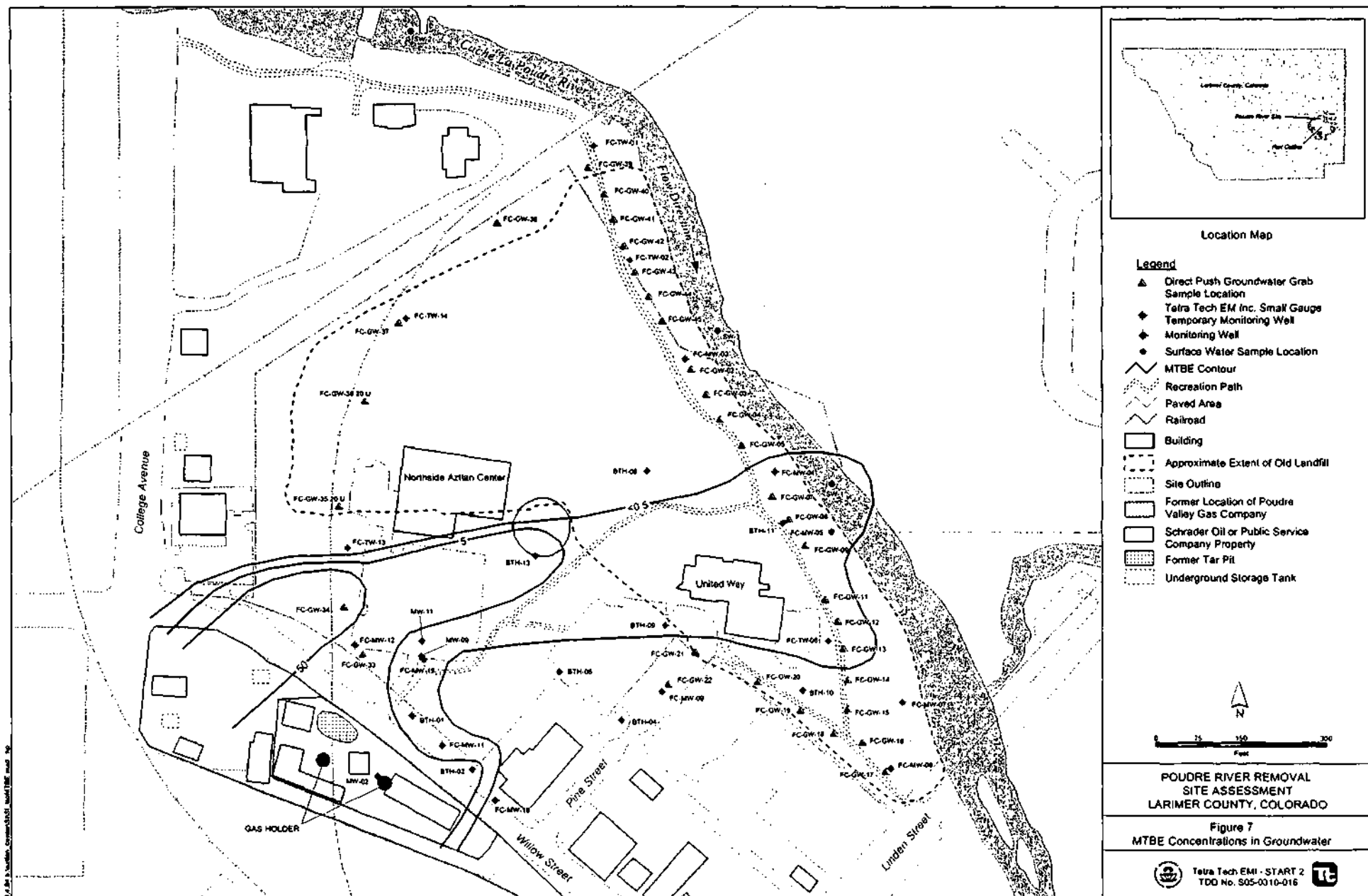
- Paved Area
- Recreation Path
- Railroad
- Historic Cache la Poudre River Channel
- Building
- Approximate Extent of Old Landfill
- Site Outline
- Former Location of Poudre Valley Gas Company
- Schrader Oil or Public Service Company Property
- Former Tar Pit
- Former Underground Storage Tank

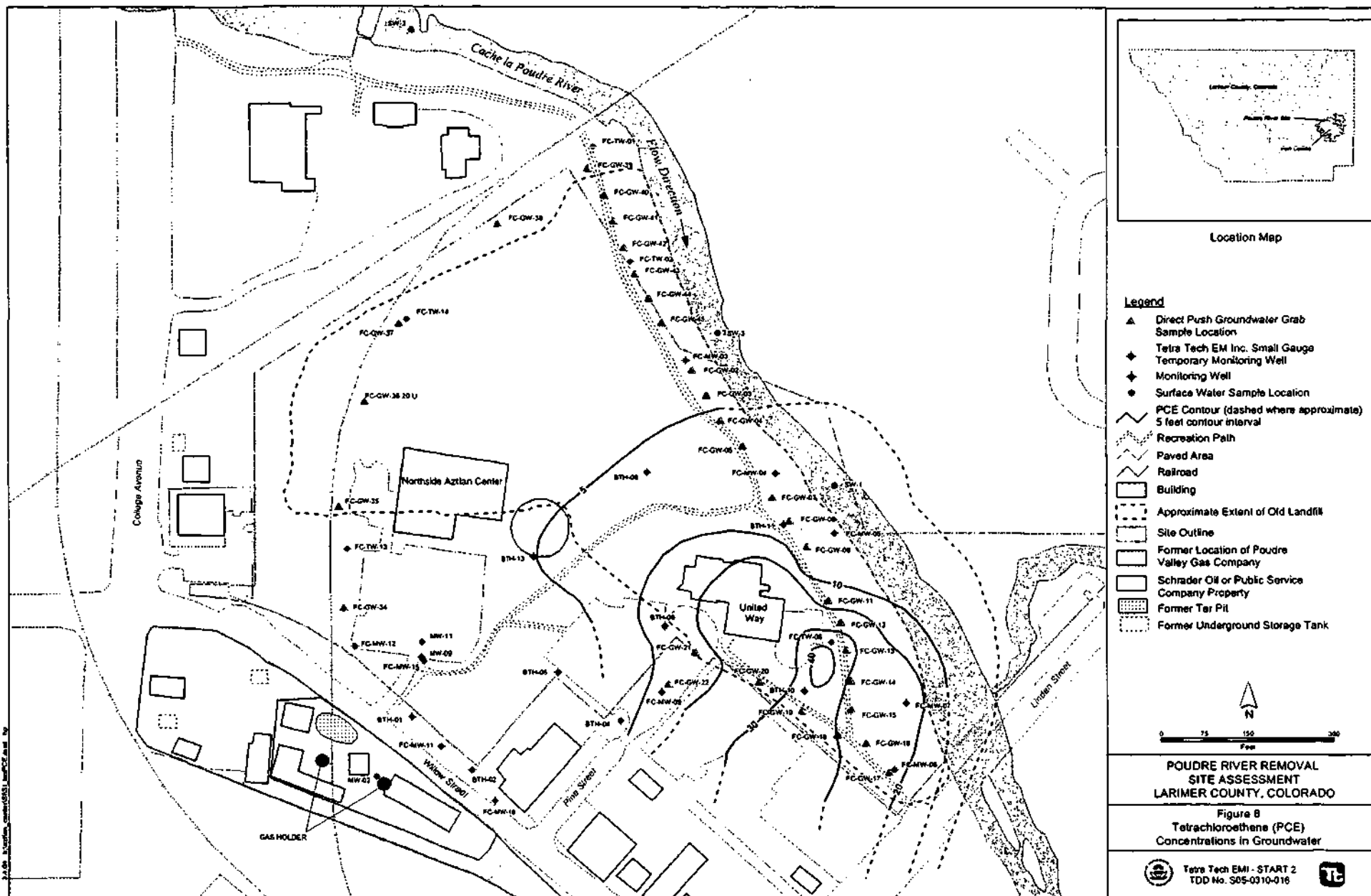


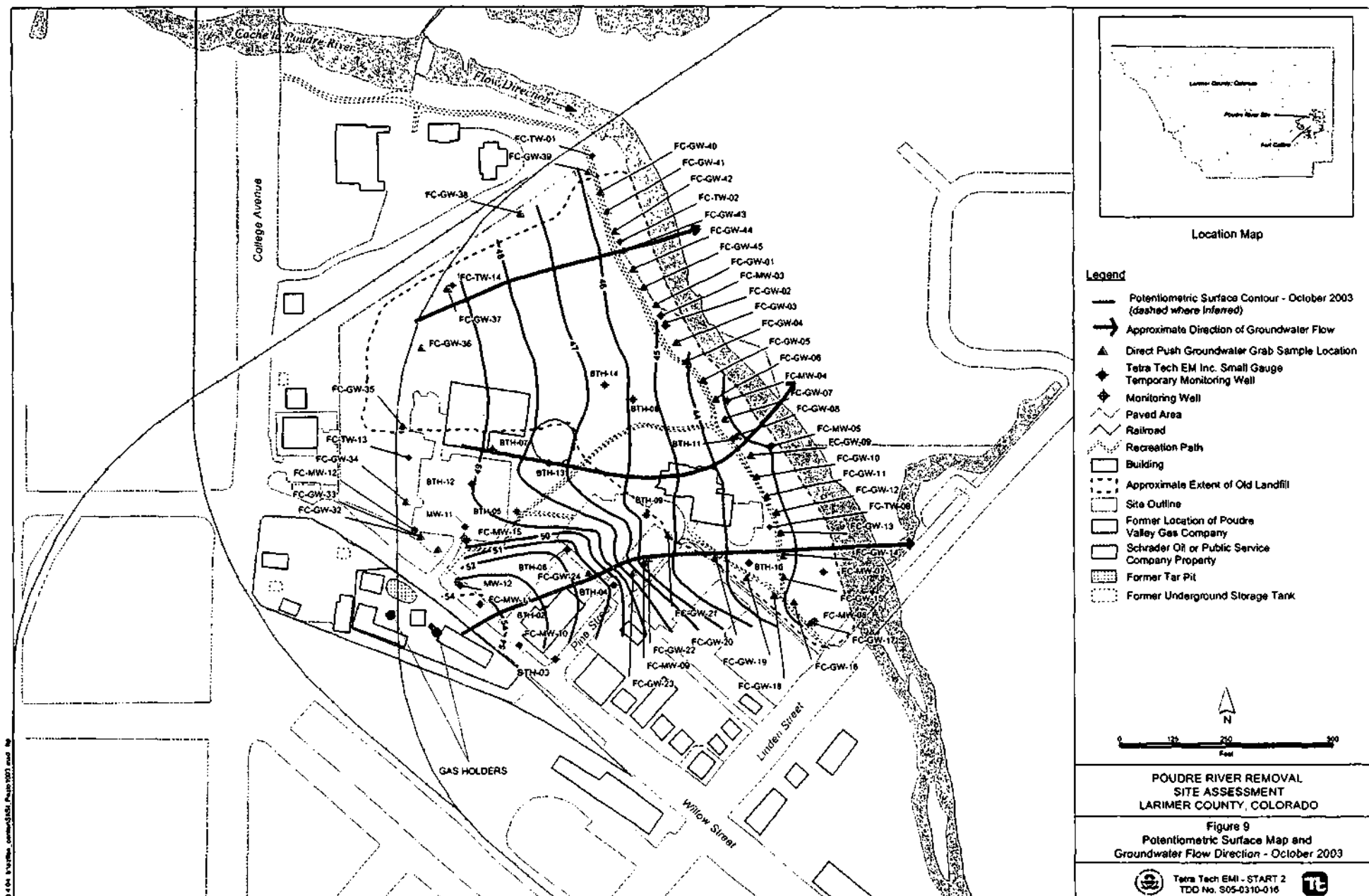
POUDRE RIVER REMOVAL
SITE ASSESSMENT
LARIMER COUNTY, COLORADO

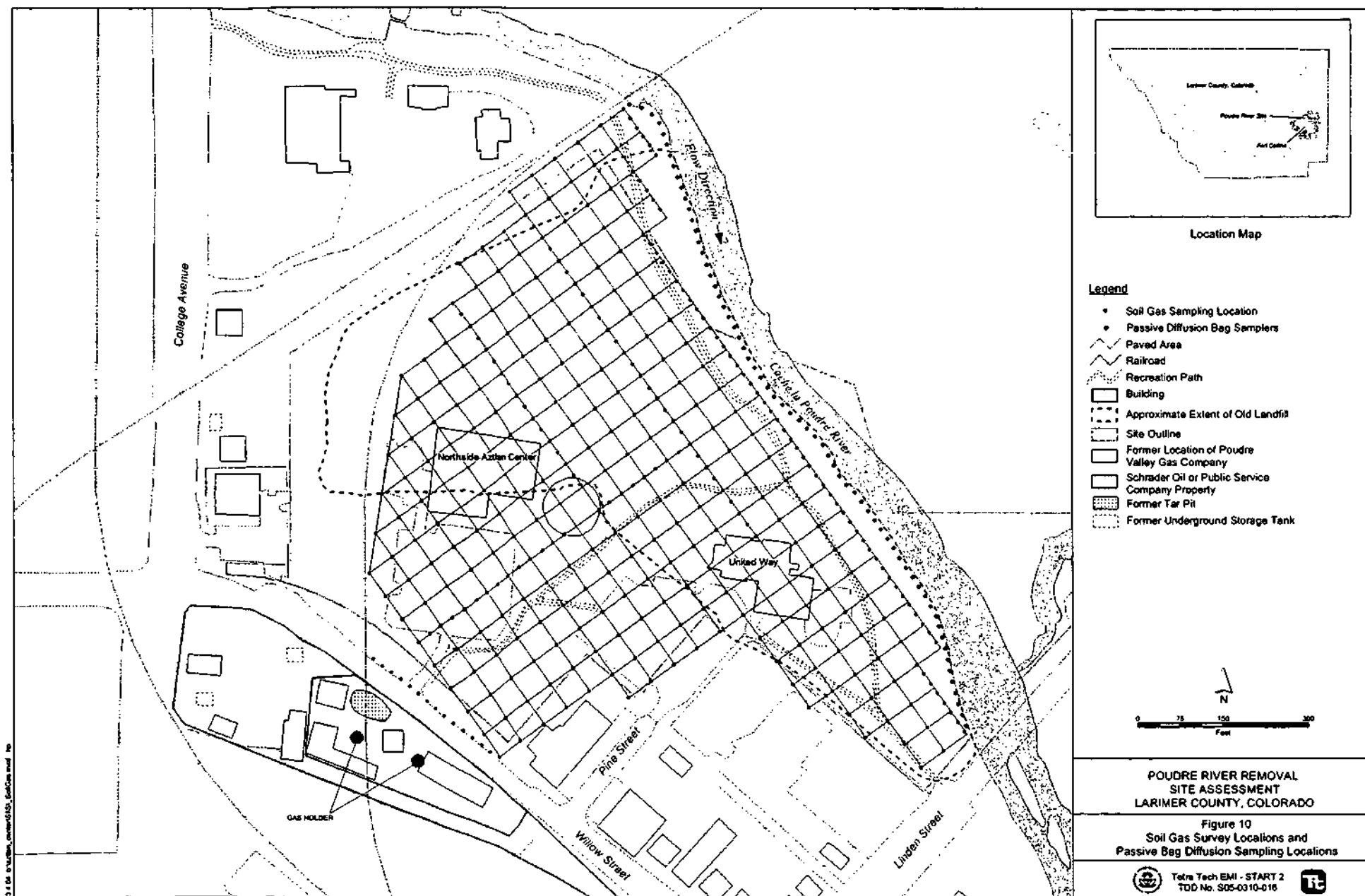
Figure 4
Approximate Location of Former River Channel

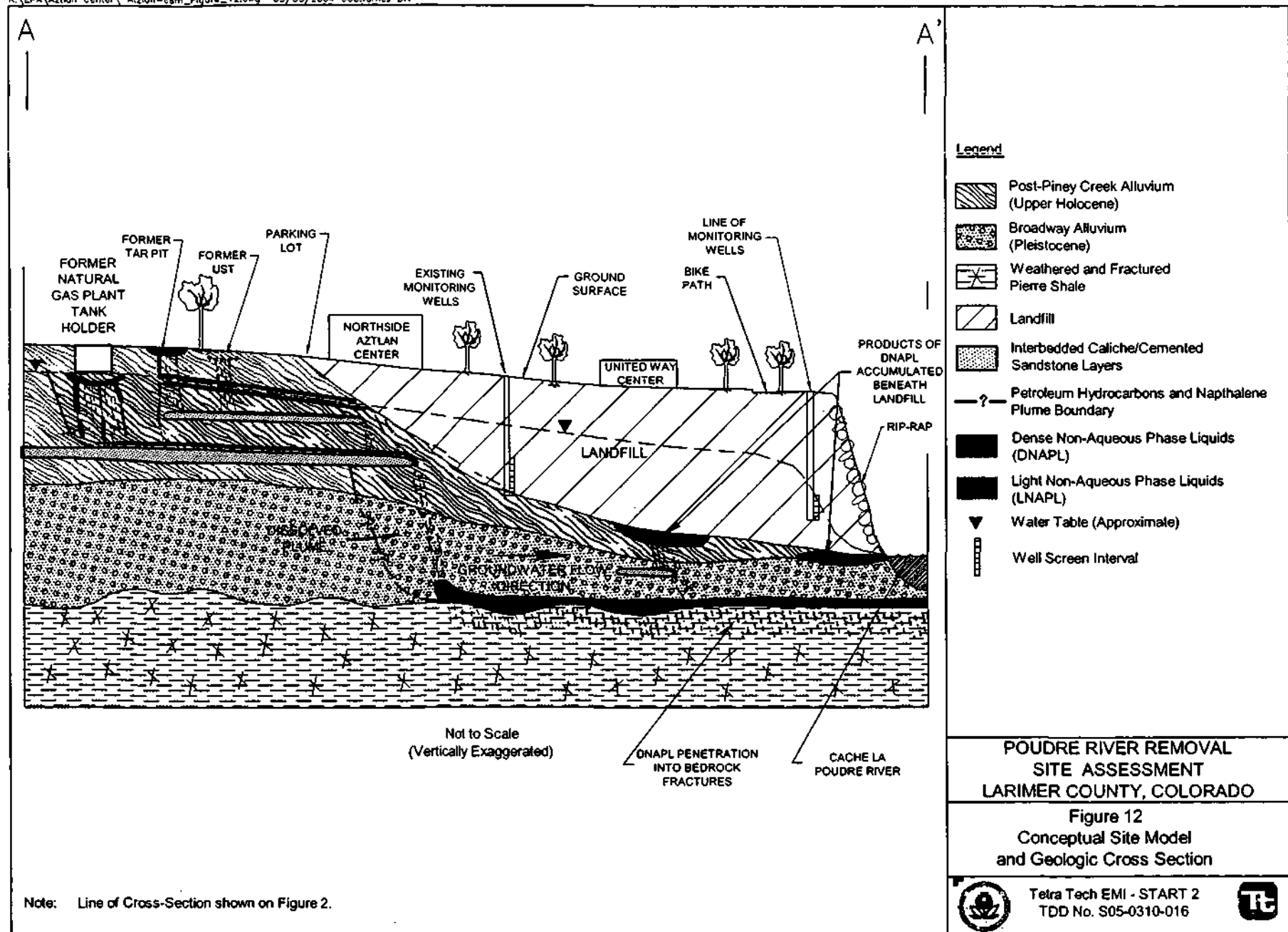












TABLES

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**TABLE 2
SAMPLE PLAN CHECKLIST**

Sample Location	Sample Type	Field Parameters					Chemical Analysis					Quality Control Samples (frequency of collection)		
		PH/PID	Temp	pH	ORP	Cond.	VOC	SVOC	TPH-g	TPH-o	Anions	MS/MSD 5%	Dup 10%	Field Blank
SA-GW-01	Groundwater Grab	X					X	X	X	X				
SA-GW-02	Groundwater Grab	X					X	X	X	X				
SA-GW-03	Groundwater Grab	X					X	X	X	X		X		
SA-GW-04	Groundwater Grab	X					X	X	X	X				X
SA-GW-05	Groundwater Grab	X					X	X	X	X				
SA-GW-06	Groundwater Grab	X					X	X	X	X				
SA-GW-07	Groundwater Grab	X					X	X	X	X			X	
SA-GW-08	Groundwater Grab	X					X	X	X	X				
SA-GW-09	Groundwater Grab	X					X	X	X	X				
SA-GW-10	Groundwater Grab	X					X	X	X	X				
TTMW-01	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-02	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-03	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-04	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-05	Monitoring well	X	X	X	X	X	X	X	X	X	X		X	
TTMW-06	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-07	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-08	Monitoring well	X	X	X	X	X	X	X	X	X	X			X
TTMW-09	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-10	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-11	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-12	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-13	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-14	Monitoring well	X	X	X	X	X	X	X	X	X	X		X	
TTMW-15	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-16	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-17	Monitoring well	X	X	X	X	X	X	X	X	X	X	X		
TTMW-18	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-19	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-20	Monitoring well	X	X	X	X	X	X	X	X	X	X			
Passive Diffusion Bag Sampler	SA-B5-01 through SA-B5-70						X					X	X	X
SI-SB-01	Subsurface Soil						X	X	X	X				
SI-SB-02	Subsurface Soil	X					X	X	X	X				
SI-SB-03	Subsurface Soil	X					X	X	X	X				

TABLE 3
SAMPLE CONTAINER TYPES, VOLUMES, AND PRESERVATION

Sample Matrix	Analysis	Analytical Method Number	Container Number and Type	Required Volume	Preservation	Technical Holding Time
Water	VOC	SW-846 Method 8260 (Target analytes include naphthalene and MTBE)	3 - AGV	40 milliliter	Cool to 4_C HCl to pH < 2	14 Days
Water	SVOC	SW-846 Method 8270	2-AGB	1 liter	Cool to 4_C	7days/40 days
Water	TPH- extractable	SW-846 Method 8015M	2 AGB	1-liter	Cool to 4_C	7days/40 days
Water	TPH- purgeable	SW-846 Method 8015M	3 AGV	40 milliliter	Cool to 4_C HCl to pH < 2	14 days
Water	Anions	EPA 300.0	1 HDPE	1 liter	Cool to 4_C	48 hours
Soil/Product	VOC	SW-846 Method 8260 (Target analytes include naphthalene and MTBE)	1 Glass	4 ounce	Cool to 4_C	14 Days
Soil/Product	SVOC	SW-846 Method 8270	1 Glass	8 ounce	Cool to 4_C	14 Days
Soil/Product	TPH- extractable	SW-846 Method 8015M	1 Glass	8 ounce	Cool to 4_C	14 Days
Soil/Product	TPH- purgeable	SW-846 Method 8015M	1 Glass	4 ounce	Cool to 4_C	14 Days

Notes:

AGB	Amber glass bottle
AGV	Amber glass vial
HDPE	High density polyethylene
MTBE	Methyl tert butyl ether
SVOC	Semivolatile organic compounds
SW846	SW-846 (EPA 1996b)
TPH	Total Petroleum Hydrocarbons
VOC	Volatile Organic Compound

TABLE 5
POUDRE RIVER REMOVAL
SITE ASSESSMENT
DATA QUALITY OBJECTIVE STEPS

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	STEP 7
State the Problem	Identify the Decisions	Identify the Inputs to the Decisions	Define Study Boundaries	Develop Decision Rules	Specify Tolerable Limits on Errors	Optimize Sampling Design
<p>Free product has been found in the Cache La Poudre River adjacent to the Azilan Center in Fort Collins, Larimer County, Colorado. A targeted Brownfields assessment (TBA) conducted in 2003 also identified dissolved contaminants in groundwater and additional free product adjacent to the Cache La Poudre River at the site.</p> <p>Prior to designing or implementing remedial strategies at the site, EPA seeks to identify source areas and potential pathways for mobile NAPL reaching the Cache La Poudre River as well as refining the existing conceptual site model (CSM).</p> <p>Secondary considerations include: evaluating the extent of contamination in the vicinity of the landfill.</p>	<p>(1) Is there an ongoing source of mobile NAPL extending from the site to the impacted area in the Cache La Poudre River?</p> <p>(2) If mobile NAPL is extending from the site to the Cache La Poudre River, what potential pathways is the contaminant following?</p> <p>(3) Are source areas present at the site and what is their approximate extent?</p>	<p>Geophysical surveys, visual observations, passive soil gas results, passive diffusion bag samplers, UV fluorescence tests, and fixed laboratory data for total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), and semi-volatile organic compounds (SVOCs).</p> <p>Physical and chemical data used to refine the conceptual site model (CSM).</p>	<p>The lateral extent of the study area encompasses the Azilan Center property along the River north to the railroad truss, south to Linden Street, and east to Willow Street. The study boundaries may be extended beyond property boundaries during the geophysical survey to delineate the extent of the historical landfill on site.</p> <p>The vertical boundary of the study area extends from the ground surface to approximately 25 feet below the bedrock interface.</p> <p>The site Assessment (SA) schedule is planned for February and March 2004.</p>	<p>(1A) If Collaborative data¹ suggest the presence of a preferred pathway and/or contamination/NAPL, then additional invasive activity may be considered.</p> <p>(1B) If collaborative data does not suggest the presence of contamination/NAPL, then no further invasive activities will be considered.</p>	<p>Tolerable levels of decision error cannot be defined until concentrations of site contaminants can be correlated with the likelihood of encountering contamination.</p>	<p>Data obtained from the passive soil gas survey, geophysical survey, and passive diffusion bag samplers will be used to optimize invasive activities.</p>

¹ Collaborative data might include soil gas, trenching, geophysics, passive diffusion bag sample results

ATTACHMENT 1

June 27, 2003

Margit Hentschel
Natural Resources Department
City of Fort Collins
PO Box 580
Fort Collins, CO 80522

Subject: Correlation of PAH Concentrations in "Product" Found in the Poudre River and in Samples from the former Landfill and Poudre Valley Gas Plant Site

Dear Margit:

WALSH evaluated the distribution polycyclic aromatic hydrocarbons (PAHs) found in the "product" sample, collected on February 3, 2003 by URS Operating Services (UOS) from the Cache la Poudre River. We compared the "fingerprint" of PAHs in the sample from the river bed to that found in subsurface materials at the former Poudre Valley Gas (PVG) plant site and the former City-owned landfill. The data and sources used are attached.

Correlations of PAH Concentrations

The concentrations of PAHs in the "product" sample from the Poudre River have a correlation with those found in the sample from the former PVG Plant Site of 0.97.

There is a high correlation of the concentrations of the PAHs in the "product" collected from the Poudre River with those found at the former PVG plant site, (also represented in the attached Figure 1). The "fingerprints" of the PAHs strongly suggest that the PAHs in the "product" from the Poudre River and those found at the former PVG plant site have a common origin, and/or were generated by a common process.

The concentrations of PAHs in the "product" sample from the Poudre River have a correlation with those found in the sample from the former landfill of -0.21.

The negative correlation of PAH concentrations in the sample of landfill material (WALSH 2001) indicate that this material is very different in composition from the "product" found in the Poudre River (also represented in the attached Figures 1 and 2), and strongly suggests these materials do not have a common origin.

Discussion

The mere presence of PAHs in a soil, sediment, or other material is not demonstrative of a connection to any particular release containing PAHs, or to any possible source, and should not be interpreted to indicate such connections. PAHs are frequently found in

Data, Figures, and Sources

**(Attachment to June 26, 2003 Letter to City of Fort Collins: PAHs in "product"
found in Poudre River and two possible sources.)**

CA\WB\NT\Temporary Internet Files\OLKAD\Photo272003\letter.doc

Figure 1

PAHs in River Product Sample and MGP Site Test Pit

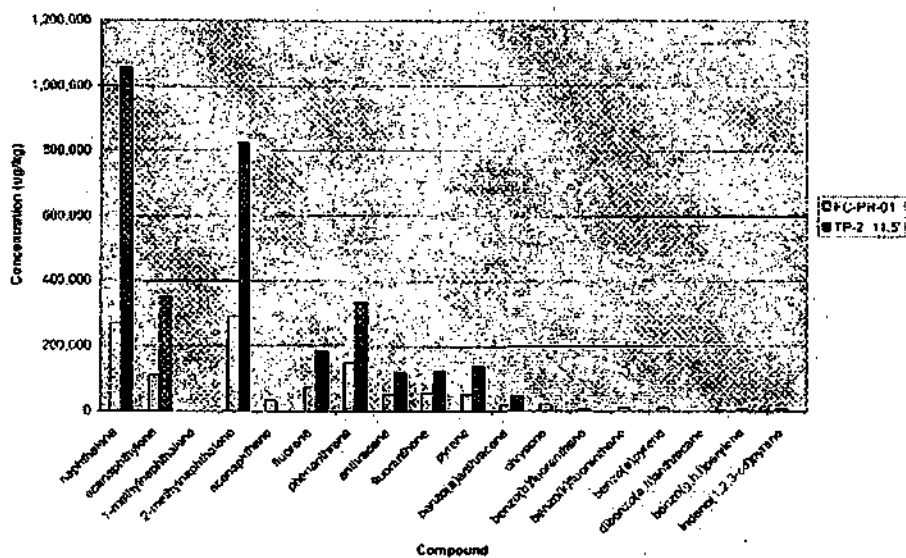
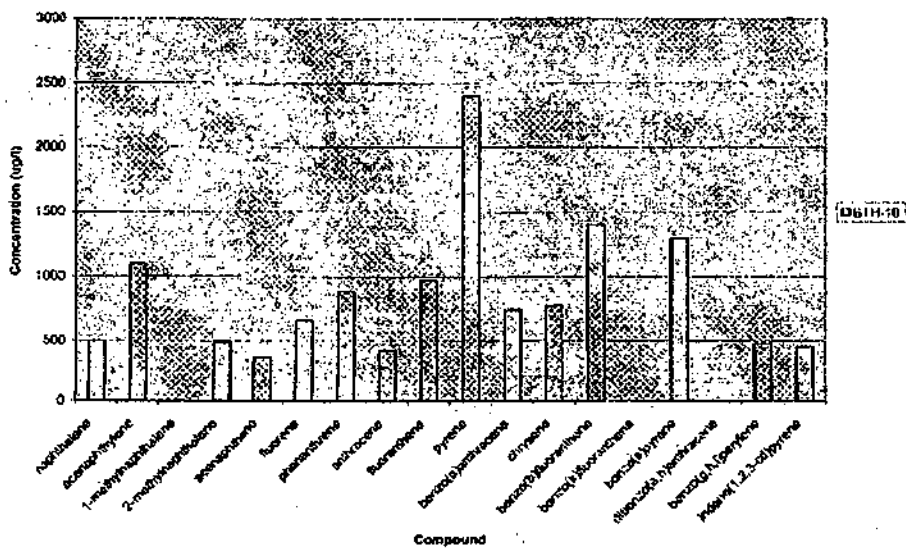


Figure 2

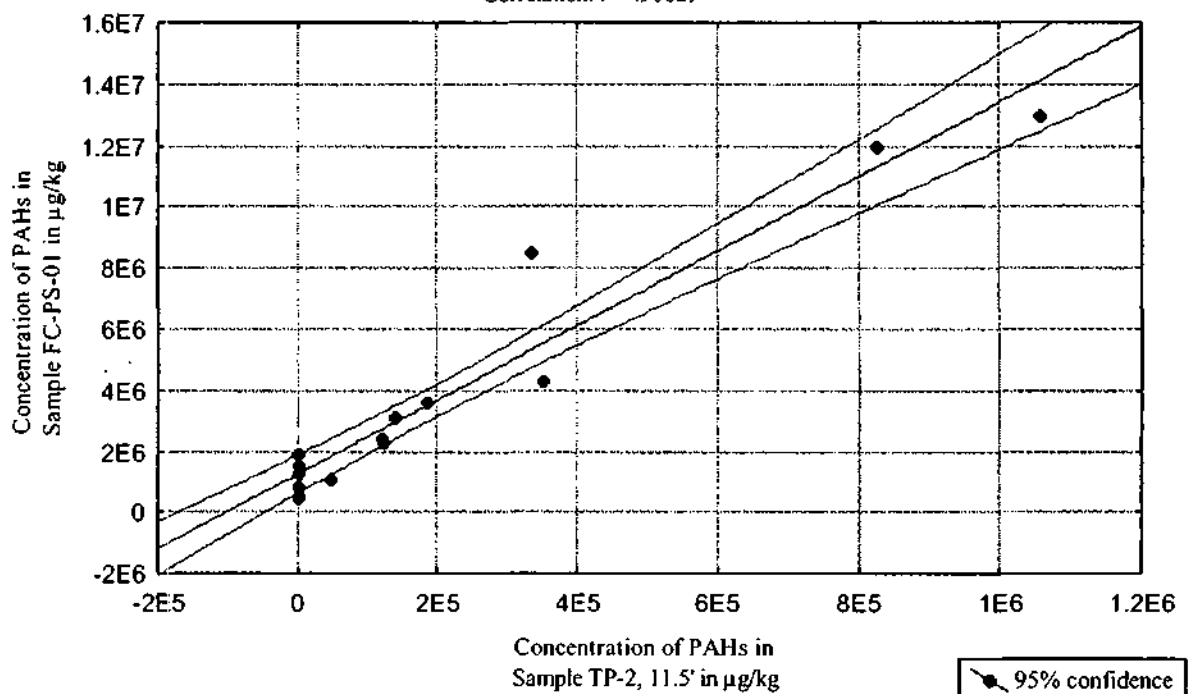
PAHs in BTH-10 soil



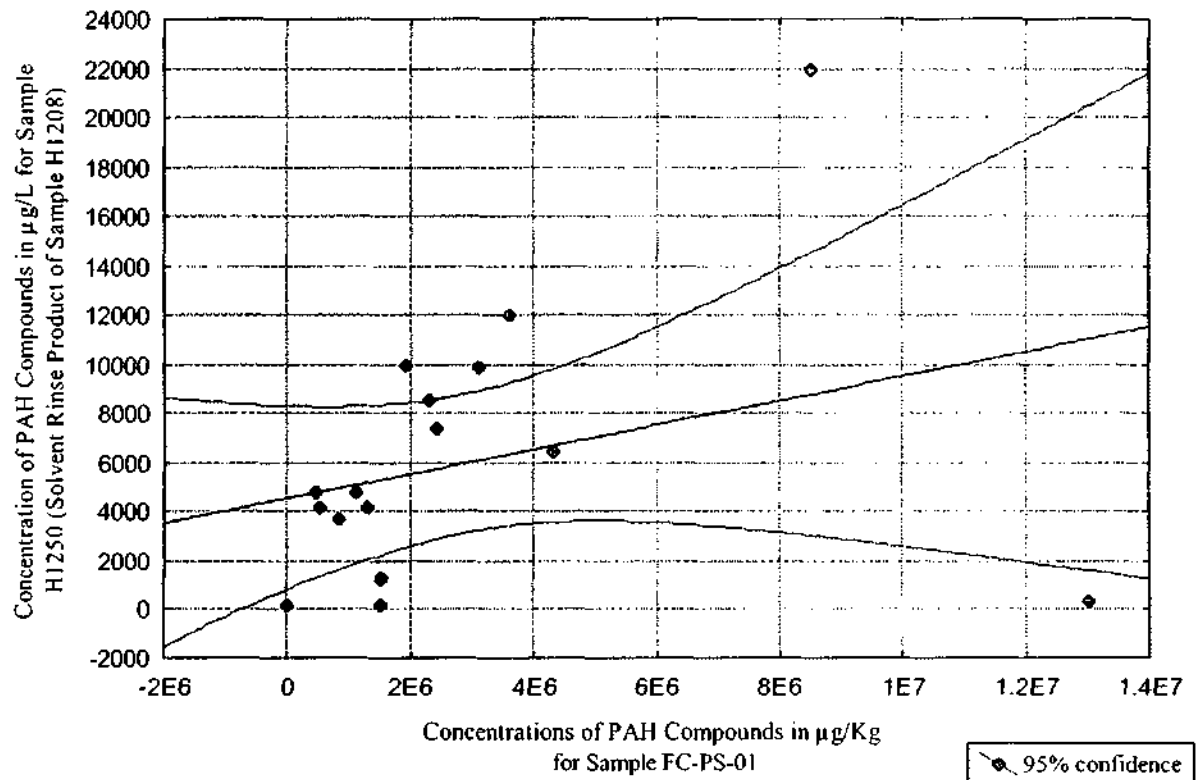
ATTACHMENT 1b

Correlation Scatterplot for Polynuclear
Aromatic Hydrocarbons (PAHs)
Poudre Valley Gas Plant Sample (TP-2, 11.5') vs.
Poudre River Product Sample (FC-PS-01)
 $FC-PS-01 = 1236E3 + 12.186 * TP-2, 11.5'$

Correlation: $r = .96629$



PAH Concentrations Scatterplot
 $H1250 = 4544.9 + .50E-3 * FC-PS-01$
Correlation: $r = .29554$



Poudre River Removal Site Assessment Soil Sampling Decision Logic

